

# FCC Radio Test Report

## FCC ID: XMR202112EC200AAU

This report concerns: Original Grant

**Project No.** : 2110H020  
**Equipment** : LTE Module  
**Brand Name** : Quectel  
**Test Model** : EC200A-AU  
**Series Model** : N/A  
**Applicant** : Quectel Wireless Solutions Co., Ltd  
**Address** : Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233.  
**Manufacturer** : Quectel Wireless Solutions Co., Ltd  
**Address** : Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233.  
**Date of Receipt** : Nov. 15, 2021  
**Date of Test** : Nov. 16, 2021 ~ Dec. 06, 2021  
**Issued Date** : Dec. 09, 2021  
**Report Version** : R00  
**Test Sample** : Engineering Sample No.: SH20211115155 for EUT, SH20211115153-3 for adapter.  
**Standard(s)** : 47 CFR FCC Part 27 Subpart L  
47 CFR FCC Part 27 Subpart M  
ANSI/TIA/EIA-603-E-2016  
FCC KDB 971168 D01 Power Meas License Digital Systems v03r01

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

*Maker Qi*  


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**Prepared by :** Maker Qi  
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TESTING CERT #5123.03

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**Declaration**

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The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

**Limitation**

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and is not use in determining the Pass/Fail results.

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**REPORT ISSUED HISTORY**

| Report Version | Description     | Issued Date   |
|----------------|-----------------|---------------|
| R00            | Original Issue. | Dec. 09, 2021 |

## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

| FCC Part 27 Subpart L,M,H,E                                              |                                                                   |          |        |
|--------------------------------------------------------------------------|-------------------------------------------------------------------|----------|--------|
| Standard(s) Section                                                      | Test Item                                                         | Judgment | Remark |
| 2.1046<br>27.50(d)(4)<br>27.50(h)(2)<br>27.50(b)(10)<br>27.50(c)(10)     | Effective Radiated Power & Equivalent<br>Isotropic Radiated Power | PASS     | -----  |
| 2.1049                                                                   | Occupied Bandwidth                                                | PASS     | -----  |
| 2.1051<br>27.53(c)(2)(4)<br>27.53(g)<br>27.53(h)<br>27.53(m)(4)          | Conducted Spurious Emissions                                      | PASS     | -----  |
| 2.1053<br>27.53(c)(2)<br>27.53(f)<br>27.53(g)<br>27.53(h)<br>27.53(m)(4) | Radiated Spurious Emissions                                       | PASS     | -----  |
| 2.1051<br>27.53(c)(2)(4)<br>27.53(g)<br>27.53(h)<br>27.53(m)(4)          | Band Edge Measurements                                            | PASS     | -----  |
| -                                                                        | Peak To Average Ratio                                             | PASS     | -----  |
| 2.1055<br>27.54                                                          | Frequency Stability                                               | PASS     | -----  |

Note:

For the verdict, the “N/A” denotes “not applicable”, the “N/T” denotes “not tested”.

### 1.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No. 29, Jintang Road, Tangzhen Industry Park, Pudong New Area, Shanghai 201210, China.

BTL's Test Firm Registration Number for FCC: 476765

BTL's Designation Number for FCC: CN1241

### 1.2 MEASUREMENT UNCERTAINTY

The measurement uncertainty figures shall be calculated according the methods described in the ETSI TR 100 028 and shall correspond to an expansion factor (coverage factor)  $k=1.96$  or  $k=2$  (which provide confidence levels of respectively 90% and 95.45% in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Measurement Uncertainty for a Level of Confidence of 95 %,  $U=2 \times U_c(y)$ .

The BTL measurement uncertainty as below table:

#### A. Radiated Measurement :

| Test Site | Method | Measurement Frequency Range | Ant.<br>H / V | U,(dB) |
|-----------|--------|-----------------------------|---------------|--------|
| SH-CB02   | CISPR  | 9 KHz~30 MHz                | -             | 2.16   |
|           |        | 30 MHz~200 MHz              | V             | 4.04   |
|           |        | 30 MHz~200 MHz              | H             | 2.90   |
|           |        | 200 MHz~1,000 MHz           | V             | 3.76   |
|           |        | 200 MHz~1,000 MHz           | H             | 3.82   |

| Test Site       | Method | Measurement Frequency Range | U,(dB) |
|-----------------|--------|-----------------------------|--------|
| SH-CB02<br>(3m) | CISPR  | 1GHz ~ 6GHz                 | 4.56   |
|                 |        | 6GHz ~ 18GHz                | 4.14   |

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

### 1.3 TEST ENVIRONMENT CONDITIONS

| Test Item                    | Temperature        | Humidity | Test Voltage | Tested By  |
|------------------------------|--------------------|----------|--------------|------------|
| Output Power & ERP           | 24°C               | 35%      | DC 3.8V      | Danny Dang |
| Occupied Bandwidth           | 24°C               | 35%      | DC 3.8V      | Danny Dang |
| Conducted Spurious Emissions | 24°C               | 35%      | DC 3.8V      | Danny Dang |
| Radiated Spurious Emissions  | 26°C               | 61%      | DC 3.8V      | Jane Wang  |
| Band Edge                    | 24°C               | 35%      | DC 3.8V      | Danny Dang |
| Peak to Average Ratio        | 24°C               | 35%      | DC 3.8V      | Danny Dang |
| Frequency Stability          | Normal and Extreme |          |              | Danny Dang |

## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

|                     |                                                         |                                         |
|---------------------|---------------------------------------------------------|-----------------------------------------|
| Equipment           | LTE Module                                              |                                         |
| Brand Name          | Quectel                                                 |                                         |
| Test Model          | EC200A-AU                                               |                                         |
| Series Model        | N/A                                                     |                                         |
| Model Difference(s) | N/A                                                     |                                         |
| Software Version    | EC200AAUHAR01A01M16                                     |                                         |
| Hardware Version    | R1.0                                                    |                                         |
| Power Source        | DC Voltage supplied from AC/DC adapter(support unit)    |                                         |
| Power Rating        | Supply voltage: 3.4–4.5V, Typical supply voltage: 3.8 V |                                         |
| Antenna Type        | Dipole                                                  |                                         |
| Antenna Gain        | WCDMA IV                                                | 2 dBi                                   |
|                     | LTE Band 4 & 66                                         |                                         |
|                     | LTE Band 7                                              | 3 dBi                                   |
| Modulation Type     | WCDMA                                                   | UL: QPSK<br>DL: QPSK,16QAM              |
|                     | WCDMA(HSDPA/HSUPA/DC-HSDPA/HSPA+)                       | 16QAM                                   |
|                     | LTE                                                     | UL: QPSK,16QAM<br>DL: QPSK,16QAM, 64QAM |
| Operation Frequency | WCDMA IV                                                | 1712.4MHz ~ 1752.6MHz                   |
|                     | LTE Band 4 (Channel Bandwidth: 1.4MHz)                  | 1710.7MHz ~ 1754.3MHz                   |
|                     | LTE Band 4 (Channel Bandwidth: 3MHz)                    | 1711.5MHz ~ 1753.5MHz                   |
|                     | LTE Band 4 (Channel Bandwidth: 5MHz)                    | 1712.5MHz ~ 1752.5MHz                   |
|                     | LTE Band 4 (Channel Bandwidth: 10MHz)                   | 1715.0MHz ~ 1750.0MHz                   |
|                     | LTE Band 4 (Channel Bandwidth: 15MHz)                   | 1717.5MHz ~ 1747.5MHz                   |
|                     | LTE Band 4 (Channel Bandwidth: 20MHz)                   | 1720.0MHz ~ 1745.0MHz                   |
|                     | LTE Band 7 (Channel Bandwidth: 5MHz)                    | 2502.5MHz ~ 2567.5MHz                   |
|                     | LTE Band 7 (Channel Bandwidth: 10MHz)                   | 2505.0MHz ~ 2565.0MHz                   |
|                     | LTE Band 7 (Channel Bandwidth: 15MHz)                   | 2507.5MHz ~ 2562.5MHz                   |
|                     | LTE Band 7 (Channel Bandwidth: 20MHz)                   | 2510.0MHz ~ 2560.0MHz                   |
|                     | LTE Band 66 (Channel Bandwidth: 1.4MHz)                 | 1710.7MHz ~ 1779.5MHz                   |
|                     | LTE Band 66 (Channel Bandwidth: 3MHz)                   | 1711.5MHz ~ 1778.5MHz                   |
|                     | LTE Band 66 (Channel Bandwidth: 5MHz)                   | 1712.5MHz ~ 1777.5MHz                   |
|                     | LTE Band 66 (Channel Bandwidth: 10MHz)                  | 1715.0MHz ~ 1775.0MHz                   |
|                     | LTE Band 66 (Channel Bandwidth: 15MHz)                  | 1717.5MHz ~ 1772.5MHz                   |
|                     | LTE Band 66 (Channel Bandwidth: 20MHz)                  | 1720.0MHz ~ 1770.0MHz                   |

|      |                                         |       |       |     |
|------|-----------------------------------------|-------|-------|-----|
| EIRP | WCDMA                                   | QPSK  | 24.85 | dBm |
|      | WCDMA_HSDPA                             | 16QAM | 25.87 | dBm |
|      | WCDMA_HSUPA                             | 16QAM | 25.97 | dBm |
|      | LTE Band 4 (Channel Bandwidth: 1.4MHz)  | QPSK  | 26.80 | dBm |
|      |                                         | 16QAM | 25.20 | dBm |
|      | LTE Band 4 (Channel Bandwidth: 3MHz)    | QPSK  | 25.50 | dBm |
|      |                                         | 16QAM | 25.00 | dBm |
|      | LTE Band 4 (Channel Bandwidth: 5MHz)    | QPSK  | 25.50 | dBm |
|      |                                         | 16QAM | 25.00 | dBm |
|      | LTE Band 4 (Channel Bandwidth: 10MHz)   | QPSK  | 25.80 | dBm |
|      |                                         | 16QAM | 25.50 | dBm |
|      | LTE Band 4 (Channel Bandwidth: 15MHz)   | QPSK  | 25.60 | dBm |
|      |                                         | 16QAM | 25.20 | dBm |
|      | LTE Band 4 (Channel Bandwidth: 20MHz)   | QPSK  | 25.70 | dBm |
|      |                                         | 16QAM | 25.30 | dBm |
|      | LTE Band 7 (Channel Bandwidth: 5MHz)    | QPSK  | 27.57 | dBm |
|      |                                         | 16QAM | 27.49 | dBm |
|      | LTE Band 7 (Channel Bandwidth: 10MHz)   | QPSK  | 27.88 | dBm |
|      |                                         | 16QAM | 27.14 | dBm |
|      | LTE Band 7 (Channel Bandwidth: 15MHz)   | QPSK  | 27.50 | dBm |
|      |                                         | 16QAM | 27.36 | dBm |
|      | LTE Band 7 (Channel Bandwidth: 20MHz)   | QPSK  | 28.27 | dBm |
|      |                                         | 16QAM | 27.26 | dBm |
|      | LTE Band 66 (Channel Bandwidth: 1.4MHz) | QPSK  | 26.42 | dBm |
|      |                                         | 16QAM | 25.81 | dBm |
|      | LTE Band 66 (Channel Bandwidth: 3MHz)   | QPSK  | 26.50 | dBm |
|      |                                         | 16QAM | 25.84 | dBm |
|      | LTE Band 66 (Channel Bandwidth: 5MHz)   | QPSK  | 26.66 | dBm |
|      |                                         | 16QAM | 25.96 | dBm |
|      | LTE Band 66 (Channel Bandwidth: 10MHz)  | QPSK  | 26.36 | dBm |
|      |                                         | 16QAM | 25.75 | dBm |
|      | LTE Band 66 (Channel Bandwidth: 15MHz)  | QPSK  | 26.38 | dBm |
|      |                                         | 16QAM | 25.67 | dBm |
|      | LTE Band 66 (Channel Bandwidth: 20MHz)  | QPSK  | 26.62 | dBm |
|      |                                         | 16QAM | 25.90 | dBm |

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. LTE (UL:QPSK; DL: QPSK) mode was found to be the worst case and recorded.

## 2.2 DESCRIPTION OF TEST MODES AND TEST CONDITION

Following channel(s) was (were) selected for the final test as listed below:

| WCDMA MODE            |                   |                  |                    |
|-----------------------|-------------------|------------------|--------------------|
| Test Item             | Available Channel | Tested Channel   | Mode               |
| EIRP                  | 1312 to 1513      | 1312, 1413, 1513 | WCDMA,HSDPA, HSUPA |
| Output Power          | 1312 to 1513      | 1312, 1413, 1513 | WCDMA,HSDPA, HSUPA |
| Occupied Bandwidth    | 1312 to 1513      | 1312, 1413, 1513 | WCDMA,HSDPA, HSUPA |
| Conducted Emission    | 1312 to 1513      | 1413             | WCDMA              |
| Radiated Emission     | 1312 to 1513      | 1413             | WCDMA              |
| Band Edge             | 1312 to 1513      | 1312, 1513       | WCDMA              |
| Peak to Average Ratio | 1312 to 1513      | 1312, 1413, 1513 | WCDMA              |
| Frequency Stability   | 1312 to 1513      | 1413             | WCDMA              |

| LTE BAND 4 MODE             |                   |                     |                   |             |                |
|-----------------------------|-------------------|---------------------|-------------------|-------------|----------------|
| Test Item                   | Available Channel | Tested Channel      | Channel Bandwidth | Modulation  | Mode           |
| Output Power & EIRP         | 19957 to 20393    | 19957, 20175, 20393 | 1.4MHz            | QPSK, 16QAM | 1RB/3RB/6RB    |
|                             | 19965 to 20385    | 19965, 20175, 20385 | 3MHz              | QPSK, 16QAM | 1RB/8RB/15RB   |
|                             | 19975 to 20375    | 19975, 20175, 20375 | 5MHz              | QPSK, 16QAM | 1RB/12RB/25RB  |
|                             | 20000 to 20350    | 20000, 20175, 20350 | 10MHz             | QPSK, 16QAM | 1RB/25RB/50RB  |
|                             | 20025 to 20325    | 20025, 20175, 20325 | 15MHz             | QPSK, 16QAM | 1RB/36RB/75RB  |
|                             | 20050 to 20300    | 20050, 20175, 20300 | 20MHz             | QPSK, 16QAM | 1RB/50RB/100RB |
| Occupied Bandwidth          | 19957 to 20393    | 19957, 20175, 20393 | 1.4MHz            | QPSK, 16QAM | 6RB            |
|                             | 19965 to 20385    | 19965, 20175, 20385 | 3MHz              | QPSK, 16QAM | 15RB           |
|                             | 19975 to 20375    | 19975, 20175, 20375 | 5MHz              | QPSK, 16QAM | 25RB           |
|                             | 20000 to 20350    | 20000, 20175, 20350 | 10MHz             | QPSK, 16QAM | 50RB           |
|                             | 20025 to 20325    | 20025, 20175, 20325 | 15MHz             | QPSK, 16QAM | 75 RB          |
|                             | 20050 to 20300    | 20050, 20175, 20300 | 20MHz             | QPSK, 16QAM | 100RB          |
| Conducted Spurious Emission | 19957 to 20393    | 20175               | 1.4MHz            | QPSK        | 1RB            |
|                             | 19975 to 20375    | 20175               | 5MHz              | QPSK        | 1RB            |
|                             | 20050 to 20300    | 20175               | 20MHz             | QPSK        | 1RB            |
| Radiated Spurious Emission  | 19957 to 20393    | 20175               | 1.4MHz            | QPSK        | 1RB            |
|                             | 19975 to 20375    | 20175               | 5MHz              | QPSK        | 1RB            |
|                             | 20050 to 20300    | 20175               | 20MHz             | QPSK        | 1RB            |

| LTE BAND 4 MODE       |                   |                     |                   |             |           |
|-----------------------|-------------------|---------------------|-------------------|-------------|-----------|
| Test Item             | Available Channel | Tested Channel      | Channel Bandwidth | Modulation  | Mode      |
| Band Edge             | 19957 to 20393    | 19957               | 1.4MHz            | QPSK        | 1RB/6RB   |
|                       |                   | 20393               | 1.4MHz            | QPSK        |           |
|                       | 19965 to 20385    | 19965               | 3MHz              | QPSK        | 1RB/15RB  |
|                       |                   | 20385               | 3MHz              | QPSK        |           |
|                       | 19975 to 20375    | 19975               | 5MHz              | QPSK        | 1RB/25RB  |
|                       |                   | 20375               | 5MHz              | QPSK        |           |
|                       | 20000 to 20350    | 20000               | 10MHz             | QPSK        | 1RB/50RB  |
|                       |                   | 20350               | 10MHz             | QPSK        |           |
|                       | 20025 to 20325    | 20025               | 15MHz             | QPSK        | 1RB/75RB  |
|                       |                   | 20325               | 15MHz             | QPSK        |           |
|                       | 20050 to 20300    | 20050               | 20MHz             | QPSK        | 1RB/100RB |
|                       |                   | 20300               | 20MHz             | QPSK        |           |
| Peak To Average Ratio | 19957 to 20393    | 19957, 20175, 20393 | 1.4MHz            | QPSK, 16QAM | 6RB       |
|                       | 19965 to 20385    | 19965, 20175, 20385 | 3MHz              | QPSK, 16QAM | 15RB      |
|                       | 19975 to 20375    | 19975, 20175, 20375 | 5MHz              | QPSK, 16QAM | 25RB      |
|                       | 20000 to 20350    | 20000, 20175, 20350 | 10MHz             | QPSK, 16QAM | 50RB      |
|                       | 20025 to 20325    | 20025, 20175, 20325 | 15MHz             | QPSK, 16QAM | 75 RB     |
|                       | 20050 to 20300    | 20050, 20175, 20300 | 20MHz             | QPSK, 16QAM | 100RB     |
| Frequency Stability   | 19957 to 20393    | 20175               | 1.4MHz            | QPSK        | 1RB       |
|                       | 19965 to 20385    | 20175               | 3MHz              | QPSK        | 1RB       |
|                       | 19975 to 20375    | 20175               | 5MHz              | QPSK        | 1RB       |
|                       | 20000 to 20350    | 20175               | 10MHz             | QPSK        | 1RB       |
|                       | 20025 to 20325    | 20175               | 15MHz             | QPSK        | 1RB       |
|                       | 20050 to 20300    | 20175               | 20MHz             | QPSK        | 1RB       |

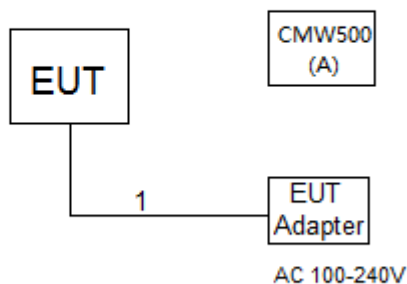
| LTE BAND 7 MODE             |                   |                     |                   |             |                |
|-----------------------------|-------------------|---------------------|-------------------|-------------|----------------|
| Test Item                   | Available Channel | Tested Channel      | Channel Bandwidth | Modulation  | Mode           |
| Output Power & EIRP         | 20775 to 21425    | 20775, 21100, 21425 | 5MHz              | QPSK, 16QAM | 1RB/12RB/25RB  |
|                             | 20800 to 21400    | 20800, 21100, 21400 | 10MHz             | QPSK, 16QAM | 1RB/25RB/50RB  |
|                             | 20825 to 21375    | 20825, 21100, 21375 | 15MHz             | QPSK, 16QAM | 1RB/36RB/75RB  |
|                             | 20850 to 21350    | 20850, 21100, 21350 | 20MHz             | QPSK, 16QAM | 1RB/50RB/100RB |
| Occupied Bandwidth          | 20775 to 21425    | 20775, 21100, 21425 | 5MHz              | QPSK, 16QAM | 25RB           |
|                             | 20800 to 21400    | 20800, 21100, 21400 | 10MHz             | QPSK, 16QAM | 50RB           |
|                             | 20825 to 21375    | 20825, 21100, 21375 | 15MHz             | QPSK, 16QAM | 75RB           |
|                             | 20850 to 21350    | 20850, 21100, 21350 | 20MHz             | QPSK, 16QAM | 100RB          |
| Conducted Spurious Emission | 20775 to 21425    | 21100               | 5MHz              | QPSK        | 1 RB           |
|                             | 20850 to 21350    | 21100               | 20MHz             | QPSK        | 1 RB           |
| Radiated Spurious Emission  | 20775 to 21425    | 21100               | 5MHz              | QPSK        | 1 RB           |
|                             | 20850 to 21350    | 21100               | 20MHz             | QPSK        | 1 RB           |
| Band Edge                   | 20775 to 21425    | 20775               | 5MHz              | QPSK        | 1RB/25RB       |
|                             |                   | 21425               | 5MHz              | QPSK        |                |
|                             | 20800 to 21400    | 20800               | 10MHz             | QPSK        | 1RB/50RB       |
|                             |                   | 21400               | 10MHz             | QPSK        |                |
|                             | 20825 to 21375    | 20825               | 15MHz             | QPSK        | 1RB/75RB       |
|                             |                   | 21375               | 15MHz             | QPSK        |                |
|                             | 20850 to 21350    | 20850               | 20MHz             | QPSK        | 1RB/100RB      |
|                             |                   | 21350               | 20MHz             | QPSK        |                |
| Peak To Average Ratio       | 20775 to 21425    | 20775, 21100, 21425 | 5MHz              | QPSK, 16QAM | 25RB           |
|                             | 20800 to 21400    | 20800, 21100, 21400 | 10MHz             | QPSK, 16QAM | 50RB           |
|                             | 20825 to 21375    | 20825, 21100, 21375 | 15MHz             | QPSK, 16QAM | 75RB           |
|                             | 20850 to 21350    | 20850, 21100, 21350 | 20MHz             | QPSK, 16QAM | 100RB          |
| Frequency Stability         | 20775 to 21425    | 21100               | 5MHz              | QPSK        | 1RB            |
|                             | 20800 to 21400    | 21100               | 10MHz             | QPSK        | 1RB            |
|                             | 20825 to 21375    | 21100               | 15MHz             | QPSK        | 1RB            |
|                             | 20850 to 21350    | 21100               | 20MHz             | QPSK        | 1RB            |

| LTE BAND 66 MODE            |                   |                        |                   |             |                |
|-----------------------------|-------------------|------------------------|-------------------|-------------|----------------|
| Test Item                   | Available Channel | Tested Channel         | Channel Bandwidth | Modulation  | Mode           |
| Output Power & EIRP         | 131979 to 132665  | 131979, 132322, 132665 | 1.4MHz            | QPSK, 16QAM | 1RB/3RB/6RB    |
|                             | 131987 to 132657  | 131987, 132322, 132657 | 3MHz              | QPSK, 16QAM | 1RB/8RB/15RB   |
|                             | 131997 to 132647  | 131997, 132322, 132647 | 5MHz              | QPSK, 16QAM | 1RB/12RB/25RB  |
|                             | 132022 to 132622  | 132022, 132322, 132622 | 10MHz             | QPSK, 16QAM | 1RB/25RB/50RB  |
|                             | 132047 to 132597  | 132047, 132322, 132597 | 15MHz             | QPSK, 16QAM | 1RB/36RB/75RB  |
|                             | 132072 to 132572  | 132072, 132322, 132572 | 20MHz             | QPSK, 16QAM | 1RB/50RB/100RB |
| Occupied Bandwidth          | 131979 to 132665  | 131979, 132322, 132665 | 1.4MHz            | QPSK, 16QAM | 6RB            |
|                             | 131987 to 132657  | 131987, 132322, 132657 | 3MHz              | QPSK, 16QAM | 15RB           |
|                             | 131997 to 132647  | 131997, 132322, 132647 | 5MHz              | QPSK, 16QAM | 25RB           |
|                             | 132022 to 132622  | 132022, 132322, 132622 | 10MHz             | QPSK, 16QAM | 50RB           |
|                             | 132047 to 132597  | 132047, 132322, 132597 | 15MHz             | QPSK, 16QAM | 75 RB          |
|                             | 132072 to 132572  | 132072, 132322, 132572 | 20MHz             | QPSK, 16QAM | 100RB          |
| Conducted Spurious Emission | 131979 to 132665  | 132322                 | 1.4MHz            | QPSK        | 1RB            |
|                             | 131997 to 132647  | 132322                 | 5MHz              | QPSK        | 1RB            |
|                             | 132072 to 132572  | 132322                 | 20MHz             | QPSK        | 1RB            |
| Radiated Spurious Emission  | 131979 to 132665  | 132665                 | 1.4MHz            | QPSK        | 1RB            |
|                             | 131997 to 132647  | 132647                 | 5MHz              | QPSK        | 1RB            |
|                             | 132072 to 132572  | 132572                 | 20MHz             | QPSK        | 1RB            |

| LTE BAND 66 MODE      |                   |                        |                   |             |           |
|-----------------------|-------------------|------------------------|-------------------|-------------|-----------|
| Test Item             | Available Channel | Tested Channel         | Channel Bandwidth | Modulation  | Mode      |
| Band Edge             | 131979 to 132665  | 131979                 | 1.4MHz            | QPSK        | 1RB/6RB   |
|                       |                   | 132665                 | 1.4MHz            | QPSK        |           |
|                       | 131987 to 132657  | 131987                 | 3MHz              | QPSK        | 1RB/15RB  |
|                       |                   | 132657                 | 3MHz              | QPSK        |           |
|                       | 131997 to 132647  | 131997                 | 5MHz              | QPSK        | 1RB/25RB  |
|                       |                   | 132647                 | 5MHz              | QPSK        |           |
|                       | 132022 to 132622  | 132022                 | 10MHz             | QPSK        | 1RB/50RB  |
|                       |                   | 132622                 | 10MHz             | QPSK        |           |
|                       | 132047 to 132597  | 132047                 | 15MHz             | QPSK        | 1RB/75RB  |
|                       |                   | 132597                 | 15MHz             | QPSK        |           |
|                       | 132072 to 132572  | 132072                 | 20MHz             | QPSK        | 1RB/100RB |
|                       |                   | 132572                 | 20MHz             | QPSK        |           |
| Peak To Average Ratio | 131979 to 132665  | 131979, 132322, 132665 | 1.4MHz            | QPSK, 16QAM | 1RB       |
|                       | 131987 to 132657  | 131987, 132322, 132657 | 3MHz              | QPSK, 16QAM | 1RB       |
|                       | 131997 to 132647  | 131997, 132322, 132647 | 5MHz              | QPSK, 16QAM | 1RB       |
|                       | 132022 to 132622  | 132022, 132322, 132622 | 10MHz             | QPSK, 16QAM | 1RB       |
|                       | 132047 to 132597  | 132047, 132322, 132597 | 15MHz             | QPSK, 16QAM | 1RB       |
|                       | 132072 to 132572  | 132072, 132322, 132572 | 20MHz             | QPSK, 16QAM | 1RB       |
| Frequency Stability   | 131979 to 132665  | 132322                 | 1.4MHz            | QPSK        | 1RB       |
|                       | 131987 to 132657  | 132322                 | 3MHz              | QPSK        | 1RB       |
|                       | 131997 to 132647  | 132322                 | 5MHz              | QPSK        | 1RB       |
|                       | 132022 to 132622  | 132322                 | 10MHz             | QPSK        | 1RB       |
|                       | 132047 to 132597  | 132322                 | 15MHz             | QPSK        | 1RB       |
|                       | 132072 to 132572  | 132322                 | 20MHz             | QPSK        | 1RB       |

Note: The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

## 2.3 BLOCK DIGRAM SHOWING THECONFIGURATIONOFSYSTEMTESTED



## 2.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Item | Equipment | Mfr/Brand | Model/Type No. | Series No. |
|------|-----------|-----------|----------------|------------|
| A    | CMW500    | N/A       | N/A            | 129246     |

| Item | Cable Type | Shielded Type | Ferrite Core | Length |
|------|------------|---------------|--------------|--------|
| 1    | DC         | N/A           | N/A          | 1m     |

### 3. TEST RESULT

#### 3.1 OUTPUT POWER MEASUREMENT

##### 3.1.1 LIMIT

Mobile / Portable station are limited to 1 watts e.i.r.p. (WCDMA Band IV & LTE Band 4 & LTE Band 66)

Mobile / Portable station are limited to 2 watts e.i.r.p. (LTE Band 7)

##### 3.1.2 TEST PROCEDURE

The testing follows FCC KDB 971168 v03r01 Section 5.

##### EIRP/ERP:

EIRP= Conducted Power +Antenan gain

ERP power=EIPR power-2.15dBi.

##### Output Power:

The EUT was set up for the maximum power with LTE link data modulation and link up with simulator.

Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

##### 3.1.3 TEST SETUP LAYOUT

Conducted Power Measurement



##### 3.1.4 TEST DEVIATION

No deviation

##### 3.1.5 TEST RESULTS

Please refer to the Appendix A.

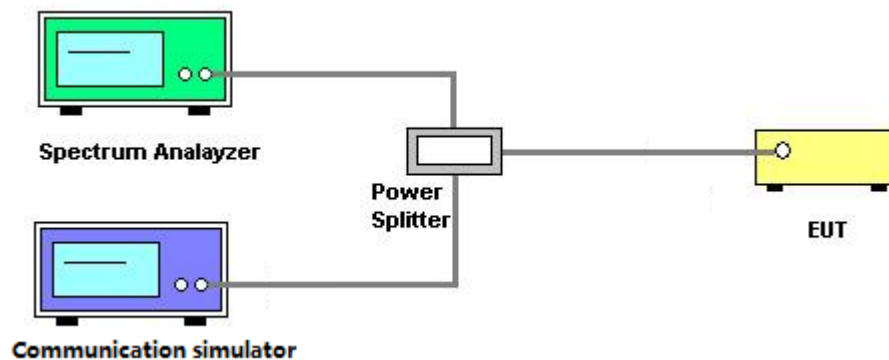
## 3.2 OCCUPIED BANDWIDTH MEASUREMENT

### 3.2.1 TEST PROCEDURE

The testing follows FCC KDB 971168 v03r01 Section 4.

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth and 26dB bandwidth.

### 3.2.2 TEST SETUP LAYOUT



### 3.2.3 TEST DEVIATION

No deviation

### 3.2.4 TEST RESULTS

Please refer to the Appendix B.

### 3.3 CONDUCTED EMISSIONS MEASUREMENT

#### 3.3.1 LIMIT

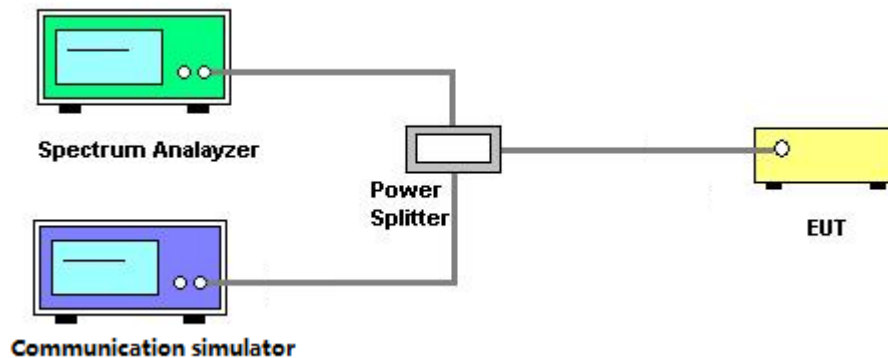
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. The emission limit equal to -13dBm. (WCDMA Band IV, LTE Band 4, Band 66.)

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $55 + 10 \log(P)$  dB. The emission limit equal to -25dBm. (LTE Band 7)

#### 3.3.2 TEST PROCEDURES

1. The testing follows FCC KDB 971168 v03r01 Section 6.0.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured. Set RBW  $\geq 1\%$  EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Set spectrum analyzer with RMS detector.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

#### 3.3.3 TEST SETUP LAYOUT



#### 3.3.4 TEST DEVIATION

No deviation

#### 3.3.5 TEST RESULTS

Please refer to the Appendix C.

### **3.4 RADIATED EMISSIONS MEASUREMENT**

#### **3.4.1 LIMIT**

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. The emission limit equal to -13dBm.

(WCDMA Band IV, LTE Band 4, Band 66.)

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $55 + 10 \log(P)$  dB. The emission limit equal to -25dBm. (LTE Band 7.)

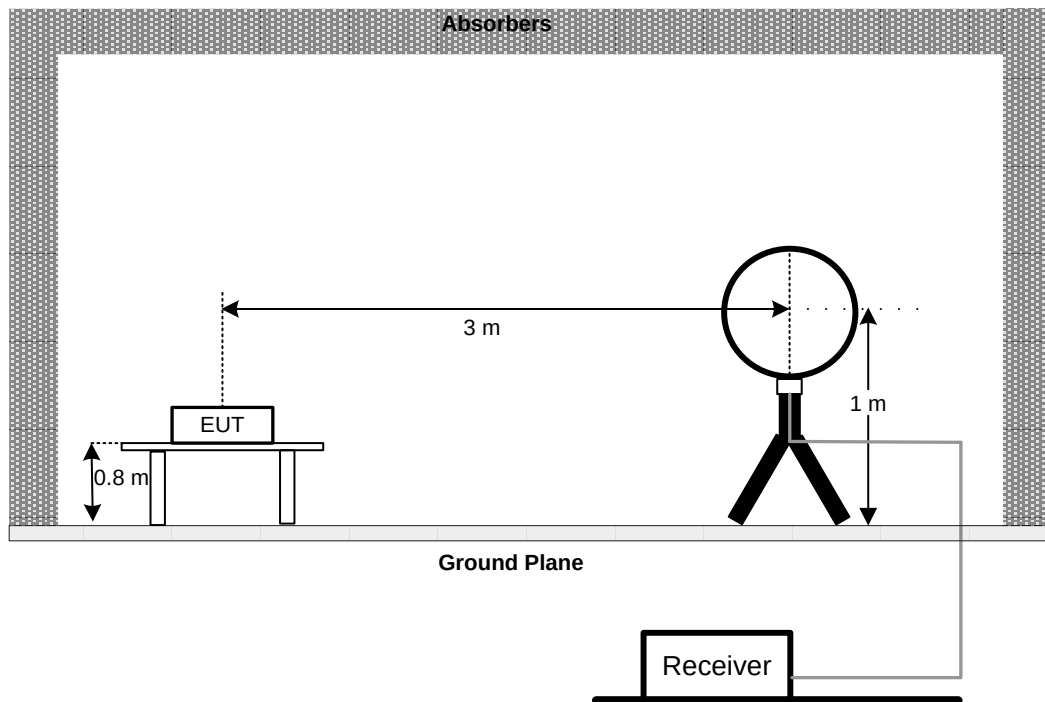
#### **3.4.2 TEST PROCEDURES**

The testing follows FCC KDB 971168 v03r01 Section 6.2.

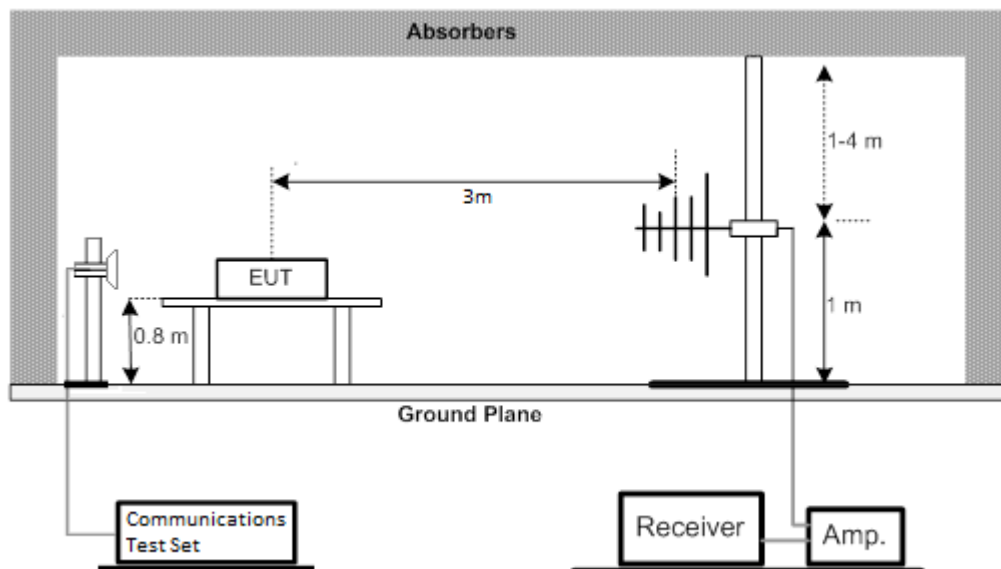
1. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
2. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G
3.  $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}.$
4. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole,  $E.R.P \text{ power} = E.I.P.R \text{ power} - 2.15\text{dBi}.$
5. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

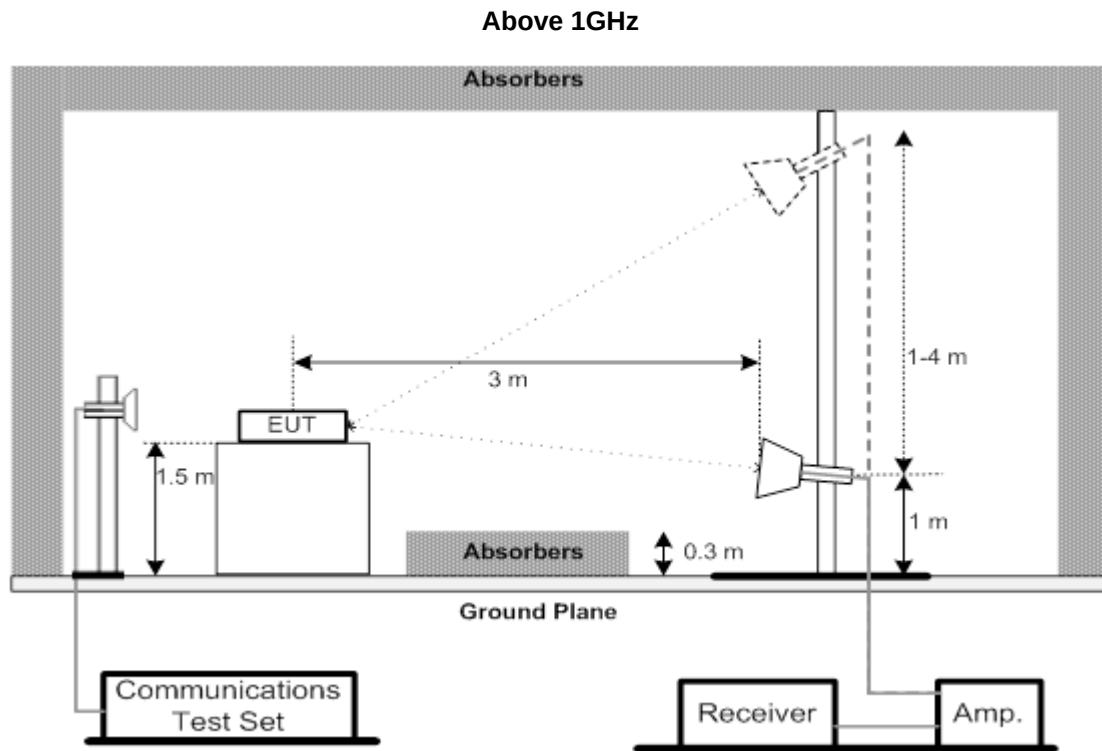
## 3.4.3 TEST SETUP LAYOUT

### Below 30MHz



### 30MHz to 1GHz





#### 3.4.4 TEST RESULTS (9KHZ TO 30MHZ)

Please refer to the APPENDIX D.

#### 3.4.5 TEST RESULTS (30MHZ TO 1000MHZ)

Please refer to the APPENDIX E.

#### 3.4.6 TEST RESULTS (ABOVE 1000MHZ)

Please refer to the APPENDIX F.

### **3.5 BAND EDGE MEASUREMENT**

#### **3.5.1 LIMIT**

The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P)$  dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed. (LTE Band 4, Band 66.)

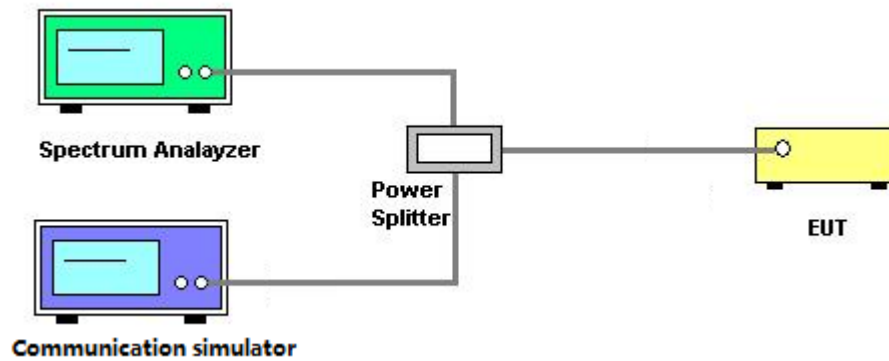
For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. (LTE Band 7)

#### **3.5.2 TEST PROCEDURES**

The testing follows FCC KDB 971168 v03r01 Section 6.

1. All measurements were done at low and high operational frequency range.
2. The center frequency of spectrum is the band edge frequency and span is 2MHz. RB of the spectrum is 15kHz and VB of the spectrum is 43kHz (LTE Bandwidth 1.4MHz).
3. The center frequency of spectrum is the band edge frequency and span is 2MHz. RB of the spectrum is 30kHz and VB of the spectrum is 91kHz (LTE Bandwidth 3MHz).
4. The center frequency of spectrum is the band edge frequency and span is 2MHz. RB of the spectrum is 51kHz and VB of the spectrum is 150kHz (LTE Bandwidth 5MHz).
5. The center frequency of spectrum is the band edge frequency and span is 2MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (LTE Bandwidth 10MHz).
6. The center frequency of spectrum is the band edge frequency and span is 2MHz. RB of the spectrum is 150kHz and VB of the spectrum is 470kHz (LTE Bandwidth 15MHz).
7. The center frequency of spectrum is the band edge frequency and span is 2MHz. RB of the spectrum is 200kHz and VB of the spectrum is 620kHz (LTE Bandwidth 20MHz).
8. Record the max trace plot into the test report.

### 3.5.3 TEST SETUP LAYOUT



### 3.5.4 TEST DEVIATION

No deviation

### 3.5.5 TEST RESULTS

Please refer to the Appendix G.

### 3.6 PEAK TO AVERAGE RATIO MEASUREMENT

#### 3.6.1 LIMIT

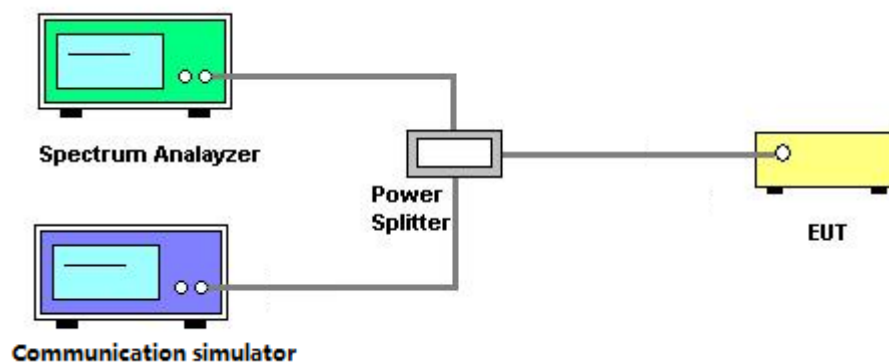
In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

#### 3.6.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 5.7.

1. Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

#### 3.6.3 TEST SETUP LAYOUT



#### 3.6.4 TEST DEVIATION

No deviation

#### 3.6.5 TEST RESULTS

Please refer to the Appendix H.

### 3.7 FREQUENCY STABILITY MEASUREMENT

#### 3.7.1 LIMIT

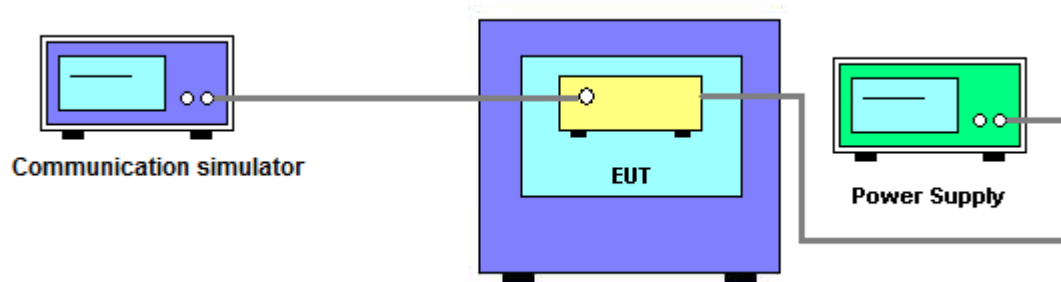
$\pm 1.5$  ppm is for base and fixed station.  $\pm 2.5$  ppm is for mobile station.

#### 3.7.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 9.

1. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
2. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
3. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the  $\pm 0.5^{\circ}\text{C}$  during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.
4. The frequency error was recorded frequency error from the communication simulator.

#### 3.7.3 TEST SETUP LAYOUT



#### 3.7.4 TEST DEVIATION

No deviation

#### 3.7.5 TEST RESULTS

Please refer to the Appendix I.

#### 4. LIST OF MEASUREMENT EQUIPMENTS

| Radiated Emission Measurement(9K-30M) |                                   |              |                          |            |                  |
|---------------------------------------|-----------------------------------|--------------|--------------------------|------------|------------------|
| Item                                  | Kind of Equipment                 | Manufacturer | Type No.                 | Serial No. | Calibrated until |
| 1                                     | Loop Antenna                      | EMCI         | EMCI LPA600              | 275        | May. 20, 2022    |
| 2                                     | MXE EMI Receiver                  | Keysight     | N9038A                   | MY56400088 | Mar. 21, 2022    |
| 3                                     | Measurement Software              | Farad        | EZ-EMC<br>Ver.NB-03A1-01 | N/A        | N/A              |
| 4                                     | Wideband Radio Communication Test | R&S          | CMW500                   | 129246     | Aug. 23, 2022    |

| Radiated Emission Measurement(30M-1G) |                                   |              |                          |            |                  |
|---------------------------------------|-----------------------------------|--------------|--------------------------|------------|------------------|
| Item                                  | Kind of Equipment                 | Manufacturer | Type No.                 | Serial No. | Calibrated until |
| 1                                     | TRILOG Broadband Antenna          | Schwarzbeck  | VULB 9160                | 9160-3233  | Mar. 26, 2022    |
| 2                                     | Pre-Amplifier                     | emci         | EMC9135                  | 980401     | Mar. 20, 2022    |
| 3                                     | MXE EMI Receiver                  | Keysight     | N9038A                   | MY56400088 | Mar. 21, 2022    |
| 4                                     | Test Cable                        | emci         | EMC104-SM-SM-7000        | 181020     | Apr. 11, 2022    |
| 5                                     | Test Cable                        | emci         | EMC104-SM-SM-2500        | 170618     | Apr. 11, 2022    |
| 6                                     | Test Cable                        | emci         | EMC104-SM-SM-800         | 170647     | Apr. 11, 2022    |
| 7                                     | Measurement Software              | Farad        | EZ-EMC<br>Ver.NB-03A1-01 | N/A        | N/A              |
| 8                                     | Wideband Radio Communication Test | R&S          | CMW500                   | 129246     | Aug. 23, 2022    |

| Radiated Emission Measurement(1G-18G) |                                      |              |                          |            |                  |
|---------------------------------------|--------------------------------------|--------------|--------------------------|------------|------------------|
| Item                                  | Kind of Equipment                    | Manufacturer | Type No.                 | Serial No. | Calibrated until |
| 1                                     | Double Ridged Broadband Horn Antenna | Schwarzbeck  | BBHA 9120D               | 9120D-1817 | Mar. 26, 2022    |
| 2                                     | Pre-Amplifier                        | emci         | EMC051845SE              | 980725     | Aug. 23, 2022    |
| 3                                     | EXA Spectrum Analyzer                | Keysight     | N9010A                   | MY56480579 | Mar. 21, 2022    |
| 4                                     | Test Cable                           | emci         | EMC104-SM-SM-7000        | 181020     | Apr. 11, 2022    |
| 5                                     | Test Cable                           | emci         | EMC104-SM-SM-2500        | 170618     | Apr. 11, 2022    |
| 6                                     | Test Cable                           | emci         | EMC104-SM-SM-800         | 170647     | Apr. 11, 2022    |
| 7                                     | Measurement Software                 | Farad        | EZ-EMC<br>Ver.NB-03A1-01 | N/A        | N/A              |
| 8                                     | Wideband Radio Communication Test    | R&S          | CMW500                   | 129246     | Aug. 23, 2022    |

| Conducted Emission & Band Edge & Occupied Bandwidth Measurement |                                   |              |             |            |                  |
|-----------------------------------------------------------------|-----------------------------------|--------------|-------------|------------|------------------|
| Item                                                            | Kind of Equipment                 | Manufacturer | Type No.    | Serial No. | Calibrated until |
| 1                                                               | Wideband Radio Communication Test | R&S          | CMW500      | 129246     | Aug. 23, 2022    |
| 2                                                               | EXA Spectrum Analyzer             | Keysight     | N9010A      | MY56480579 | Mar. 21, 2022    |
| 3                                                               | Power Divider                     | JUK          | PD-2SF-2060 | N/A        | N/A              |

| Frequency Stability Measurement |                                   |              |             |            |                  |
|---------------------------------|-----------------------------------|--------------|-------------|------------|------------------|
| Item                            | Kind of Equipment                 | Manufacturer | Type No.    | Serial No. | Calibrated until |
| 1                               | Wideband Radio Communication Test | R&S          | CMW500      | 129246     | Aug. 23, 2022    |
| 2                               | EXA Spectrum Analyzer             | Keysight     | N9010A      | MY56480579 | Mar. 21, 2022    |
| 3                               | Power Divider                     | JUK          | PD-2SF-2060 | N/A        | N/A              |
| 4                               | Temperature And Humidity Box      | Blue pand    | BPHS-120B   | 170616454  | Aug. 23, 2022    |

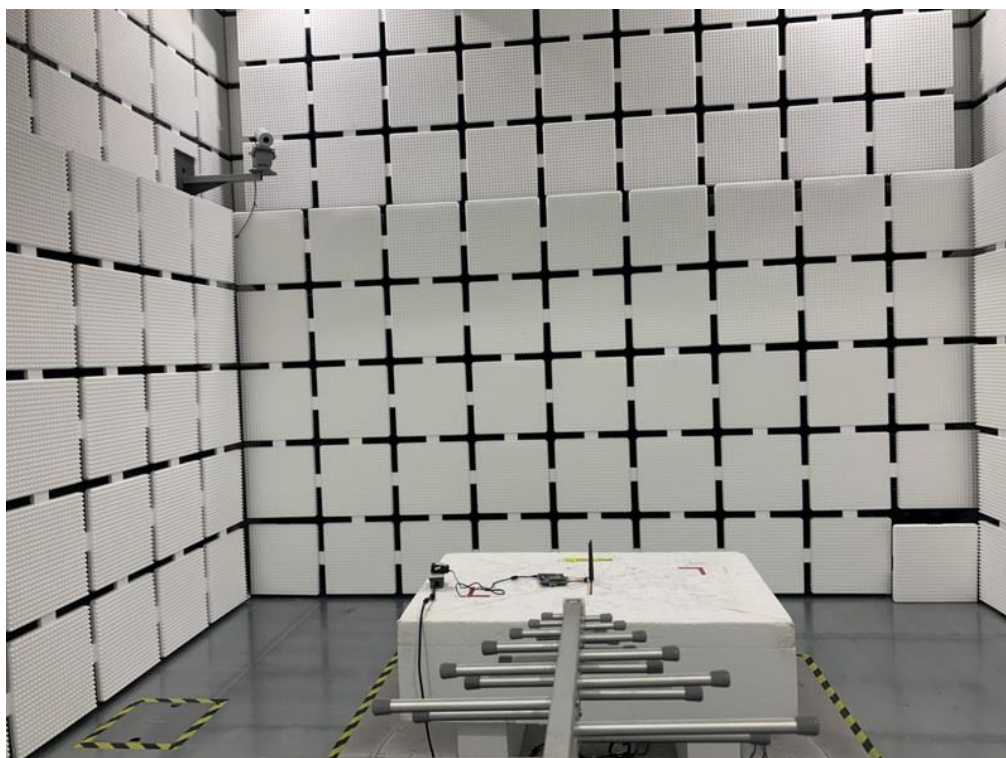
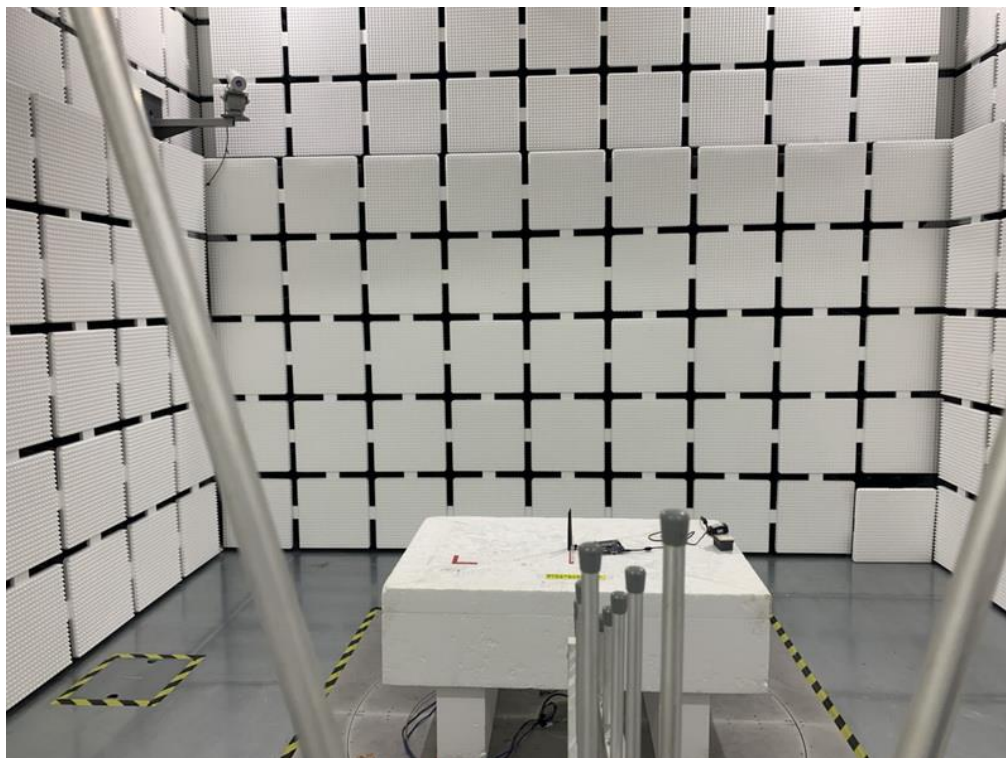
Remark: "N/A" denotes no model name, serial no. or calibration specified.

All calibration period of equipment list is one year.

## 5. EUT TEST PHOTO

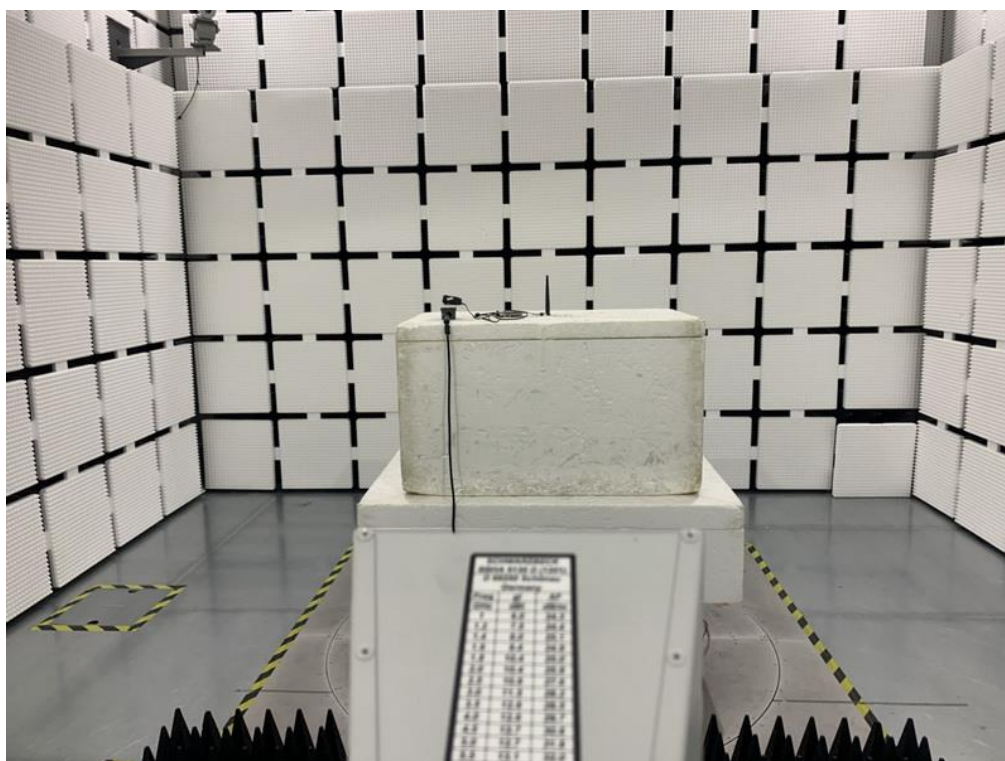
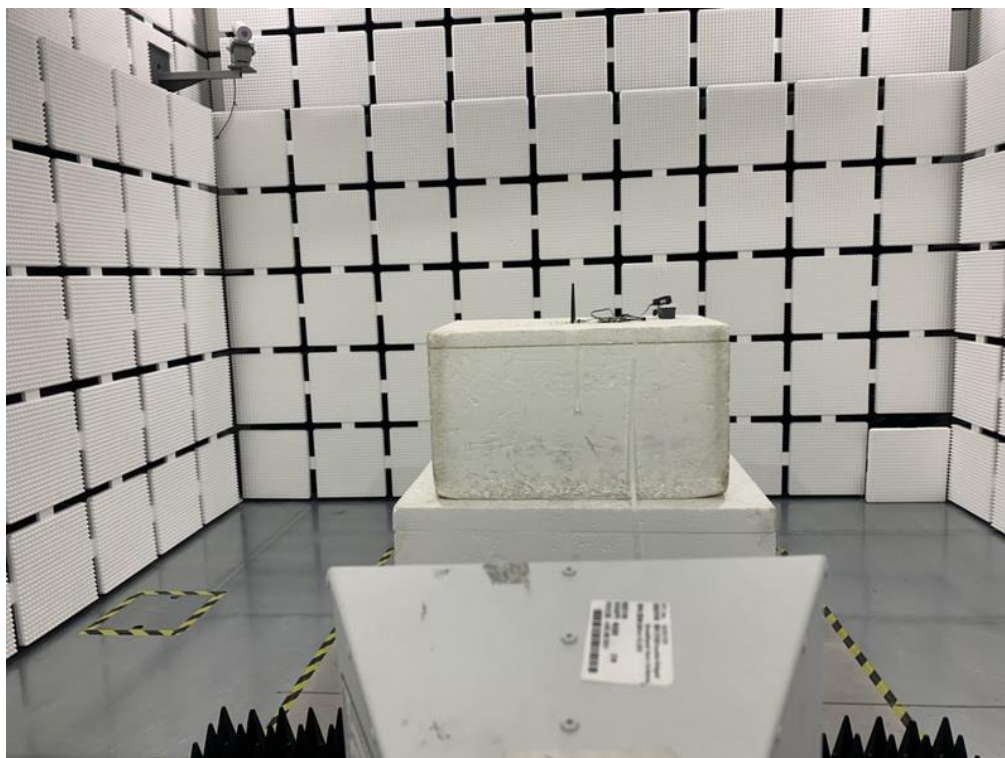
### Radiated Emissions Test Photos

30 MHz to 1000 MHz



**Radiated Emissions Test Photos**

**Above 1 GHz**



## **APPENDIX A - OUTPUT POWER**

**Output Power (dBm):**

| Modulation | Band            | WCDMA Band IV |           |           |
|------------|-----------------|---------------|-----------|-----------|
|            | Tx Channel      | 1312CH        | 1413CH    | 1513CH    |
|            | Frequency       | 1712.4MHz     | 1732.6MHz | 1752.6MHz |
| QPSK       | RMC 12.2K       | 22.19         | 22.48     | 22.25     |
|            | RMC 64K         | 22.38         | 21.99     | 21.94     |
|            | RMC 144K        | 22.85         | 22.13     | 22.84     |
|            | RMC 384K        | 22.37         | 21.15     | 22.82     |
|            | HSDPA Subtest-1 | 23.55         | 23.87     | 23.43     |
|            | HSDPA Subtest-2 | 23.05         | 23.35     | 22.96     |
|            | HSDPA Subtest-3 | 22.54         | 22.8      | 22.5      |
|            | HSDPA Subtest-4 | 22.51         | 22.8      | 22.48     |
|            | HSUPA Subtest-1 | 23.49         | 23.87     | 23.54     |
|            | HSUPA Subtest-2 | 23.44         | 23.84     | 23.49     |
|            | HSUPA Subtest-3 | 23.01         | 23.34     | 23.02     |
|            | HSUPA Subtest-4 | 23.45         | 23.88     | 23.45     |
|            | HSUPA Subtest-5 | 22.98         | 23.33     | 23.97     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH    | Mid CH    | High CH   |
|---------------|------------|---------|-----------|-----------|-----------|-----------|
|               |            |         |           | 19957CH   | 20175CH   | 20393CH   |
|               |            |         |           | 1710.7MHz | 1732.5MHz | 1754.3MHz |
| 4 / 1.4M      | QPSK       | 1       | 0         | 23.60     | 23.50     | 23.20     |
|               |            | 1       | 2         | 23.40     | 23.30     | 23.00     |
|               |            | 1       | 5         | 23.60     | 23.50     | 23.30     |
|               |            | 3       | 0         | 23.50     | 23.40     | 22.90     |
|               |            | 3       | 1         | 23.50     | 23.40     | 24.80     |
|               |            | 3       | 2         | 23.50     | 23.30     | 23.00     |
|               |            | 6       | 0         | 22.40     | 22.40     | 22.00     |
|               | 16QAM      | 1       | 0         | 23.20     | 23.10     | 22.90     |
|               |            | 1       | 2         | 22.80     | 22.90     | 22.50     |
|               |            | 1       | 5         | 23.20     | 23.10     | 22.80     |
|               |            | 3       | 0         | 22.60     | 22.50     | 22.10     |
|               |            | 3       | 1         | 22.60     | 22.50     | 22.10     |
|               |            | 3       | 2         | 22.50     | 22.50     | 22.10     |
|               |            | 6       | 0         | 21.80     | 21.80     | 21.30     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH    | Mid CH    | High CH   |
|---------------|------------|---------|-----------|-----------|-----------|-----------|
|               |            |         |           | 19965CH   | 20175CH   | 20385CH   |
|               |            |         |           | 1711.5MHz | 1732.5MHz | 1753.5MHz |
| 4 / 3M        | QPSK       | 1       | 0         | 23.30     | 23.50     | 22.90     |
|               |            | 1       | 7         | 23.30     | 23.30     | 22.90     |
|               |            | 1       | 14        | 23.20     | 23.30     | 23.00     |
|               |            | 8       | 0         | 22.40     | 22.40     | 21.90     |
|               |            | 8       | 4         | 22.40     | 22.40     | 22.10     |
|               |            | 8       | 7         | 22.40     | 22.30     | 22.00     |
|               |            | 15      | 0         | 22.40     | 22.40     | 22.00     |
|               | 16QAM      | 1       | 0         | 23.00     | 23.00     | 22.40     |
|               |            | 1       | 7         | 22.90     | 22.80     | 22.50     |
|               |            | 1       | 14        | 22.90     | 22.90     | 22.50     |
|               |            | 8       | 0         | 21.40     | 21.50     | 21.00     |
|               |            | 8       | 4         | 21.40     | 21.40     | 21.10     |
|               |            | 8       | 7         | 21.40     | 21.50     | 21.00     |
|               |            | 15      | 0         | 21.40     | 21.50     | 21.00     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH    | Mid CH    | High CH   |
|---------------|------------|---------|-----------|-----------|-----------|-----------|
|               |            |         |           | 19975CH   | 20175CH   | 20375CH   |
|               |            |         |           | 1712.5MHz | 1732.5MHz | 1752.5MHz |
| 4 / 5M        | QPSK       | 1       | 0         | 23.50     | 23.50     | 23.10     |
|               |            | 1       | 13        | 23.20     | 23.30     | 22.90     |
|               |            | 1       | 24        | 23.20     | 23.20     | 23.20     |
|               |            | 12      | 0         | 22.40     | 22.50     | 21.90     |
|               |            | 12      | 6         | 22.40     | 22.40     | 23.30     |
|               |            | 12      | 11        | 22.90     | 22.30     | 22.00     |
|               |            | 25      | 0         | 22.30     | 22.40     | 22.00     |
|               | 16QAM      | 1       | 0         | 23.00     | 23.00     | 22.60     |
|               |            | 1       | 13        | 22.80     | 22.90     | 22.60     |
|               |            | 1       | 24        | 22.90     | 22.80     | 22.70     |
|               |            | 12      | 0         | 21.40     | 21.60     | 21.20     |
|               |            | 12      | 6         | 21.40     | 21.60     | 21.10     |
|               |            | 12      | 11        | 21.30     | 21.40     | 21.20     |
|               |            | 25      | 0         | 21.20     | 21.50     | 21.00     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH  | Mid CH    | High CH |
|---------------|------------|---------|-----------|---------|-----------|---------|
|               |            |         |           | 20000CH | 20175CH   | 20350CH |
|               |            |         |           | 1715MHz | 1732.5MHz | 1750MHz |
| 4 / 10M       | QPSK       | 1       | 0         | 23.60   | 23.50     | 22.60   |
|               |            | 1       | 25        | 23.80   | 23.20     | 22.80   |
|               |            | 1       | 49        | 22.80   | 23.00     | 23.10   |
|               |            | 25      | 0         | 22.10   | 22.30     | 21.60   |
|               |            | 25      | 13        | 23.10   | 22.20     | 21.80   |
|               |            | 25      | 25        | 22.70   | 21.90     | 21.80   |
|               |            | 50      | 0         | 23.00   | 22.10     | 21.70   |
|               | 16QAM      | 1       | 0         | 23.00   | 23.10     | 22.30   |
|               |            | 1       | 25        | 23.50   | 22.70     | 22.30   |
|               |            | 1       | 49        | 22.40   | 22.60     | 22.70   |
|               |            | 25      | 0         | 21.00   | 21.30     | 20.70   |
|               |            | 25      | 13        | 21.90   | 21.40     | 20.80   |
|               |            | 25      | 25        | 21.60   | 21.10     | 20.80   |
|               |            | 50      | 0         | 21.80   | 21.30     | 20.80   |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH    | Mid CH    | High CH   |
|---------------|------------|---------|-----------|-----------|-----------|-----------|
|               |            |         |           | 20025CH   | 20175CH   | 20325CH   |
|               |            |         |           | 1717.5MHz | 1732.5MHz | 1747.5MHz |
| 4 / 15M       | QPSK       | 1       | 0         | 23.30     | 23.30     | 22.20     |
|               |            | 1       | 38        | 23.60     | 23.20     | 22.70     |
|               |            | 1       | 74        | 23.50     | 22.50     | 23.00     |
|               |            | 36      | 0         | 23.10     | 22.40     | 21.40     |
|               |            | 36      | 18        | 22.80     | 22.40     | 21.70     |
|               |            | 36      | 39        | 22.60     | 21.90     | 21.80     |
|               |            | 75      | 0         | 22.70     | 22.10     | 21.80     |
|               | 16QAM      | 1       | 0         | 22.90     | 22.80     | 21.70     |
|               |            | 1       | 38        | 23.20     | 22.80     | 22.30     |
|               |            | 1       | 74        | 23.10     | 21.90     | 22.60     |
|               |            | 36      | 0         | 21.90     | 21.30     | 20.50     |
|               |            | 36      | 18        | 21.80     | 21.40     | 20.80     |
|               |            | 36      | 39        | 21.50     | 21.00     | 20.90     |
|               |            | 75      | 0         | 21.60     | 21.30     | 20.80     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH  | Mid CH    | High CH |
|---------------|------------|---------|-----------|---------|-----------|---------|
|               |            |         |           | 20050CH | 20175CH   | 20300CH |
|               |            |         |           | 1720MHz | 1732.5MHz | 1745MHz |
| 4 / 20M       | QPSK       | 1       | 0         | 23.50   | 23.50     | 23.20   |
|               |            | 1       | 50        | 23.40   | 23.20     | 22.50   |
|               |            | 1       | 99        | 23.70   | 22.60     | 23.20   |
|               |            | 50      | 0         | 22.90   | 22.30     | 20.80   |
|               |            | 50      | 25        | 22.70   | 22.30     | 21.50   |
|               |            | 50      | 50        | 22.40   | 21.50     | 21.80   |
|               |            | 100     | 0         | 22.70   | 22.00     | 21.30   |
|               | 16QAM      | 1       | 0         | 23.10   | 23.20     | 22.70   |
|               |            | 1       | 50        | 23.10   | 22.80     | 22.00   |
|               |            | 1       | 99        | 23.30   | 22.20     | 22.80   |
|               |            | 50      | 0         | 21.70   | 21.20     | 20.00   |
|               |            | 50      | 25        | 21.60   | 21.40     | 20.60   |
|               |            | 50      | 50        | 21.40   | 20.70     | 20.90   |
|               |            | 100     | 0         | 21.60   | 21.20     | 20.50   |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH    | Mid CH  | High CH   |
|---------------|------------|---------|-----------|-----------|---------|-----------|
|               |            |         |           | 20775CH   | 21100CH | 21425CH   |
|               |            |         |           | 2502.5MHz | 2535MHz | 2567.5MHz |
| 7 / 5M        | QPSK       | 1       | 0         | 24.57     | 24.53   | 24.18     |
|               |            | 1       | 13        | 24.51     | 24.07   | 24.45     |
|               |            | 1       | 24        | 24.38     | 24.00   | 24.14     |
|               |            | 12      | 0         | 23.63     | 23.42   | 24.16     |
|               |            | 12      | 6         | 23.69     | 23.22   | 23.89     |
|               |            | 12      | 11        | 23.54     | 23.17   | 23.67     |
|               |            | 25      | 0         | 23.58     | 23.15   | 23.80     |
|               | 16QAM      | 1       | 0         | 23.78     | 23.83   | 24.18     |
|               |            | 1       | 13        | 23.67     | 23.22   | 24.49     |
|               |            | 1       | 24        | 23.43     | 23.26   | 24.05     |
|               |            | 12      | 0         | 22.80     | 22.57   | 24.01     |
|               |            | 12      | 6         | 22.80     | 22.38   | 23.68     |
|               |            | 12      | 11        | 22.66     | 22.25   | 23.63     |
|               |            | 25      | 0         | 22.63     | 22.27   | 23.78     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH  | Mid CH  | High CH |
|---------------|------------|---------|-----------|---------|---------|---------|
|               |            |         |           | 20800CH | 21100CH | 21400CH |
|               |            |         |           | 2505MHz | 2535MHz | 2565MHz |
| 7 / 10M       | QPSK       | 1       | 0         | 24.59   | 24.16   | 24.88   |
|               |            | 1       | 25        | 23.73   | 23.98   | 24.01   |
|               |            | 1       | 49        | 23.76   | 23.82   | 23.49   |
|               |            | 25      | 0         | 23.14   | 23.56   | 23.33   |
|               |            | 25      | 13        | 22.96   | 23.60   | 23.27   |
|               |            | 25      | 25        | 22.60   | 22.86   | 23.72   |
|               |            | 50      | 0         | 22.90   | 22.94   | 23.07   |
|               | 16QAM      | 1       | 0         | 23.86   | 23.71   | 24.14   |
|               |            | 1       | 25        | 23.01   | 23.21   | 23.42   |
|               |            | 1       | 49        | 22.99   | 23.12   | 23.09   |
|               |            | 25      | 0         | 22.40   | 22.62   | 22.33   |
|               |            | 25      | 13        | 22.13   | 22.19   | 22.32   |
|               |            | 25      | 25        | 21.75   | 21.91   | 22.74   |
|               |            | 50      | 0         | 22.08   | 22.07   | 22.14   |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH    | Mid CH  | High CH   |
|---------------|------------|---------|-----------|-----------|---------|-----------|
|               |            |         |           | 20825CH   | 21100CH | 21375CH   |
|               |            |         |           | 2507.5MHz | 2535MHz | 2562.5MHz |
| 7 / 15M       | QPSK       | 1       | 0         | 24.50     | 24.37   | 24.36     |
|               |            | 1       | 38        | 23.63     | 23.90   | 23.99     |
|               |            | 1       | 74        | 23.78     | 23.76   | 23.83     |
|               |            | 36      | 0         | 23.10     | 23.87   | 23.81     |
|               |            | 36      | 18        | 22.75     | 23.20   | 23.12     |
|               |            | 36      | 39        | 22.49     | 22.88   | 22.77     |
|               |            | 75      | 0         | 22.77     | 22.86   | 22.81     |
|               | 16QAM      | 1       | 0         | 23.86     | 23.79   | 24.36     |
|               |            | 1       | 38        | 22.76     | 23.51   | 23.97     |
|               |            | 1       | 74        | 23.03     | 23.43   | 23.83     |
|               |            | 36      | 0         | 22.30     | 22.79   | 23.84     |
|               |            | 36      | 18        | 21.98     | 22.18   | 23.12     |
|               |            | 36      | 39        | 21.58     | 21.65   | 22.83     |
|               |            | 75      | 0         | 21.95     | 21.93   | 22.87     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH  | Mid CH  | High CH |
|---------------|------------|---------|-----------|---------|---------|---------|
|               |            |         |           | 20850CH | 21100CH | 21350CH |
|               |            |         |           | 2510MHz | 2535MHz | 2560MHz |
| 7 / 20M       | QPSK       | 1       | 0         | 24.73   | 25.27   | 24.17   |
|               |            | 1       | 50        | 23.28   | 24.76   | 24.56   |
|               |            | 1       | 99        | 24.33   | 24.09   | 23.60   |
|               |            | 50      | 0         | 22.86   | 24.01   | 23.17   |
|               |            | 50      | 25        | 22.54   | 23.16   | 23.70   |
|               |            | 50      | 50        | 22.86   | 22.73   | 23.20   |
|               |            | 100     | 0         | 22.69   | 22.73   | 23.57   |
|               | 16QAM      | 1       | 0         | 23.95   | 24.26   | 23.22   |
|               |            | 1       | 50        | 22.55   | 23.31   | 23.75   |
|               |            | 1       | 99        | 23.54   | 23.40   | 23.21   |
|               |            | 50      | 0         | 21.88   | 22.82   | 22.35   |
|               |            | 50      | 25        | 21.59   | 22.10   | 22.80   |
|               |            | 50      | 50        | 21.81   | 21.63   | 22.18   |
|               |            | 100     | 0         | 21.71   | 21.66   | 22.69   |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH    | Mid CH   | High CH   |
|---------------|------------|---------|-----------|-----------|----------|-----------|
|               |            |         |           | 131979CH  | 132322CH | 132665CH  |
|               |            |         |           | 1710.7MHz | 1745MHz  | 1779.3MHz |
| 66 / 1.4M     | QPSK       | 1       | 0         | 24.19     | 24.41    | 24.42     |
|               |            | 1       | 2         | 23.83     | 24.09    | 24.11     |
|               |            | 1       | 5         | 24.30     | 24.37    | 24.36     |
|               |            | 3       | 0         | 23.90     | 24.12    | 24.10     |
|               |            | 3       | 1         | 23.93     | 24.19    | 24.18     |
|               |            | 3       | 2         | 23.95     | 24.17    | 24.17     |
|               |            | 6       | 0         | 22.91     | 24.04    | 23.06     |
|               | 16QAM      | 1       | 0         | 23.21     | 23.74    | 23.65     |
|               |            | 1       | 2         | 23.24     | 23.48    | 23.18     |
|               |            | 1       | 5         | 23.68     | 23.30    | 23.81     |
|               |            | 3       | 0         | 22.78     | 23.12    | 22.98     |
|               |            | 3       | 1         | 22.86     | 23.12    | 23.04     |
|               |            | 3       | 2         | 22.98     | 23.12    | 23.15     |
|               |            | 6       | 0         | 22.01     | 22.27    | 22.25     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH    | Mid CH   | High CH   |
|---------------|------------|---------|-----------|-----------|----------|-----------|
|               |            |         |           | 131987CH  | 132322CH | 132657CH  |
|               |            |         |           | 1711.5MHz | 1745MHz  | 1778.5MHz |
| 66 / 3M       | QPSK       | 1       | 0         | 23.99     | 24.13    | 24.50     |
|               |            | 1       | 7         | 24.04     | 24.19    | 24.40     |
|               |            | 1       | 14        | 24.11     | 24.26    | 23.17     |
|               |            | 8       | 0         | 22.97     | 23.10    | 23.51     |
|               |            | 8       | 4         | 23.08     | 23.24    | 23.43     |
|               |            | 8       | 7         | 23.06     | 23.25    | 23.30     |
|               |            | 15      | 0         | 23.03     | 23.10    | 23.38     |
|               | 16QAM      | 1       | 0         | 23.23     | 23.44    | 23.84     |
|               |            | 1       | 7         | 23.07     | 23.51    | 23.50     |
|               |            | 1       | 14        | 23.22     | 23.61    | 22.37     |
|               |            | 8       | 0         | 22.09     | 22.14    | 22.42     |
|               |            | 8       | 4         | 22.00     | 22.20    | 22.49     |
|               |            | 8       | 7         | 22.02     | 22.31    | 22.33     |
|               |            | 15      | 0         | 21.88     | 22.31    | 22.45     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH    | Mid CH   | High CH   |
|---------------|------------|---------|-----------|-----------|----------|-----------|
|               |            |         |           | 131997CH  | 132322CH | 132647CH  |
|               |            |         |           | 1712.5MHz | 1745MHz  | 1777.5MHz |
| 66 / 5M       | QPSK       | 1       | 0         | 24.04     | 24.11    | 24.66     |
|               |            | 1       | 13        | 24.05     | 24.22    | 24.51     |
|               |            | 1       | 24        | 24.25     | 24.40    | 23.38     |
|               |            | 12      | 0         | 22.98     | 23.05    | 23.50     |
|               |            | 12      | 6         | 23.11     | 23.13    | 23.49     |
|               |            | 12      | 11        | 23.10     | 23.29    | 23.50     |
|               |            | 25      | 0         | 23.06     | 23.04    | 23.58     |
|               | 16QAM      | 1       | 0         | 23.47     | 23.03    | 23.75     |
|               |            | 1       | 13        | 23.55     | 23.65    | 23.96     |
|               |            | 1       | 24        | 23.58     | 23.42    | 22.92     |
|               |            | 12      | 0         | 21.99     | 21.95    | 22.45     |
|               |            | 12      | 6         | 22.02     | 22.23    | 22.60     |
|               |            | 12      | 11        | 22.01     | 22.14    | 22.52     |
|               |            | 25      | 0         | 21.91     | 22.14    | 22.60     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH   | Mid CH   | High CH  |
|---------------|------------|---------|-----------|----------|----------|----------|
|               |            |         |           | 132022CH | 132322CH | 132622CH |
|               |            |         |           | 1715MHz  | 1745MHz  | 1775MHz  |
| 66 / 10M      | QPSK       | 1       | 0         | 24.25    | 24.02    | 24.30    |
|               |            | 1       | 25        | 24.03    | 24.09    | 24.36    |
|               |            | 1       | 49        | 24.35    | 23.76    | 23.54    |
|               |            | 25      | 0         | 22.79    | 22.69    | 22.99    |
|               |            | 25      | 13        | 22.86    | 22.97    | 23.34    |
|               |            | 25      | 25        | 22.79    | 23.08    | 23.29    |
|               |            | 50      | 0         | 22.75    | 22.85    | 23.19    |
|               | 16QAM      | 1       | 0         | 23.16    | 23.05    | 23.74    |
|               |            | 1       | 25        | 22.78    | 23.42    | 23.75    |
|               |            | 1       | 49        | 23.44    | 23.11    | 22.36    |
|               |            | 25      | 0         | 21.60    | 21.86    | 21.94    |
|               |            | 25      | 13        | 21.94    | 22.09    | 22.36    |
|               |            | 25      | 25        | 21.84    | 21.99    | 22.17    |
|               |            | 50      | 0         | 21.68    | 21.95    | 22.11    |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH    | Mid CH   | High CH   |
|---------------|------------|---------|-----------|-----------|----------|-----------|
|               |            |         |           | 132047CH  | 132322CH | 132597CH  |
|               |            |         |           | 1717.5MHz | 1745MHz  | 1772.5MHz |
| 66 / 15M      | QPSK       | 1       | 0         | 24.18     | 24.02    | 24.22     |
|               |            | 1       | 38        | 24.38     | 24.14    | 24.25     |
|               |            | 1       | 74        | 22.92     | 23.62    | 23.38     |
|               |            | 36      | 0         | 23.08     | 22.65    | 22.93     |
|               |            | 36      | 18        | 23.27     | 23.09    | 23.21     |
|               |            | 36      | 39        | 23.28     | 23.36    | 23.28     |
|               |            | 75      | 0         | 23.18     | 22.91    | 23.01     |
|               | 16QAM      | 1       | 0         | 23.08     | 23.16    | 23.67     |
|               |            | 1       | 38        | 23.51     | 23.23    | 23.32     |
|               |            | 1       | 74        | 22.28     | 22.89    | 22.72     |
|               |            | 36      | 0         | 21.97     | 21.74    | 21.84     |
|               |            | 36      | 18        | 22.41     | 22.14    | 22.16     |
|               |            | 36      | 39        | 22.28     | 22.26    | 22.30     |
|               |            | 75      | 0         | 22.19     | 21.97    | 22.05     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH   | Mid CH   | High CH  |
|---------------|------------|---------|-----------|----------|----------|----------|
|               |            |         |           | 132072CH | 132322CH | 132572CH |
|               |            |         |           | 1720MHz  | 1745MHz  | 1770MHz  |
| 66 / 20M      | QPSK       | 1       | 0         | 24.38    | 24.56    | 24.62    |
|               |            | 1       | 50        | 24.20    | 24.13    | 23.96    |
|               |            | 1       | 99        | 24.00    | 23.93    | 23.65    |
|               |            | 50      | 0         | 22.94    | 22.41    | 22.99    |
|               |            | 50      | 25        | 23.14    | 23.05    | 22.95    |
|               |            | 50      | 50        | 22.75    | 23.43    | 23.17    |
|               |            | 100     | 0         | 23.14    | 22.88    | 22.75    |
|               | 16QAM      | 1       | 0         | 23.30    | 23.54    | 23.90    |
|               |            | 1       | 50        | 23.04    | 23.35    | 23.13    |
|               |            | 1       | 99        | 23.18    | 23.40    | 22.66    |
|               |            | 50      | 0         | 21.83    | 21.42    | 22.00    |
|               |            | 50      | 25        | 22.20    | 22.07    | 21.83    |
|               |            | 50      | 50        | 21.85    | 22.41    | 22.13    |
|               |            | 100     | 0         | 22.09    | 21.94    | 21.64    |

**EIRP Power (dBm):**

| Modulation | Band            | WCDMA Band IV |           |           |
|------------|-----------------|---------------|-----------|-----------|
|            | Tx Channel      | 1312CH        | 1413CH    | 1513CH    |
|            | Frequency       | 1712.4MHz     | 1732.6MHz | 1752.6MHz |
| QPSK       | RMC 12.2K       | 24.19         | 24.48     | 24.25     |
|            | RMC 64K         | 24.38         | 23.99     | 23.94     |
|            | RMC 144K        | 24.85         | 24.13     | 24.84     |
|            | RMC 384K        | 24.37         | 23.15     | 24.82     |
|            | HSDPA Subtest-1 | 25.55         | 25.87     | 25.43     |
|            | HSDPA Subtest-2 | 25.05         | 25.35     | 24.96     |
|            | HSDPA Subtest-3 | 24.54         | 24.80     | 24.50     |
|            | HSDPA Subtest-4 | 24.51         | 24.80     | 24.48     |
|            | HSUPA Subtest-1 | 25.49         | 25.87     | 25.54     |
|            | HSUPA Subtest-2 | 25.44         | 25.84     | 25.49     |
|            | HSUPA Subtest-3 | 25.01         | 25.34     | 25.02     |
|            | HSUPA Subtest-4 | 25.45         | 25.88     | 25.45     |
|            | HSUPA Subtest-5 | 24.98         | 25.33     | 25.97     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH    | Mid CH    | High CH   |
|---------------|------------|---------|-----------|-----------|-----------|-----------|
|               |            |         |           | 19957CH   | 20175CH   | 20393CH   |
|               |            |         |           | 1710.7MHz | 1732.5MHz | 1754.3MHz |
| 4 / 1.4M      | QPSK       | 1       | 0         | 25.60     | 25.50     | 25.20     |
|               |            | 1       | 2         | 25.40     | 25.30     | 25.00     |
|               |            | 1       | 5         | 25.60     | 25.50     | 25.30     |
|               |            | 3       | 0         | 25.50     | 25.40     | 24.90     |
|               |            | 3       | 1         | 25.50     | 25.40     | 26.80     |
|               |            | 3       | 2         | 25.50     | 25.30     | 25.00     |
|               |            | 6       | 0         | 24.40     | 24.40     | 24.00     |
|               | 16QAM      | 1       | 0         | 25.20     | 25.10     | 24.90     |
|               |            | 1       | 2         | 24.80     | 24.90     | 24.50     |
|               |            | 1       | 5         | 25.20     | 25.10     | 24.80     |
|               |            | 3       | 0         | 24.60     | 24.50     | 24.10     |
|               |            | 3       | 1         | 24.60     | 24.50     | 24.10     |
|               |            | 3       | 2         | 24.50     | 24.50     | 24.10     |
|               |            | 6       | 0         | 23.80     | 23.80     | 23.30     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH    | Mid CH    | High CH   |
|---------------|------------|---------|-----------|-----------|-----------|-----------|
|               |            |         |           | 19965CH   | 20175CH   | 20385CH   |
|               |            |         |           | 1711.5MHz | 1732.5MHz | 1753.5MHz |
| 4 / 3M        | QPSK       | 1       | 0         | 25.30     | 25.50     | 24.90     |
|               |            | 1       | 7         | 25.30     | 25.30     | 24.90     |
|               |            | 1       | 14        | 25.20     | 25.30     | 25.00     |
|               |            | 8       | 0         | 24.40     | 24.40     | 23.90     |
|               |            | 8       | 4         | 24.40     | 24.40     | 24.10     |
|               |            | 8       | 7         | 24.40     | 24.30     | 24.00     |
|               |            | 15      | 0         | 24.40     | 24.40     | 24.00     |
|               | 16QAM      | 1       | 0         | 25.00     | 25.00     | 24.40     |
|               |            | 1       | 7         | 24.90     | 24.80     | 24.50     |
|               |            | 1       | 14        | 24.90     | 24.90     | 24.50     |
|               |            | 8       | 0         | 23.40     | 23.50     | 23.00     |
|               |            | 8       | 4         | 23.40     | 23.40     | 23.10     |
|               |            | 8       | 7         | 23.40     | 23.50     | 23.00     |
|               |            | 15      | 0         | 23.40     | 23.50     | 23.00     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH    | Mid CH    | High CH   |
|---------------|------------|---------|-----------|-----------|-----------|-----------|
|               |            |         |           | 19975CH   | 20175CH   | 20375CH   |
|               |            |         |           | 1712.5MHz | 1732.5MHz | 1752.5MHz |
| 4 / 5M        | QPSK       | 1       | 0         | 25.50     | 25.50     | 25.10     |
|               |            | 1       | 13        | 25.20     | 25.30     | 24.90     |
|               |            | 1       | 24        | 25.20     | 25.20     | 25.20     |
|               |            | 12      | 0         | 24.40     | 24.50     | 23.90     |
|               |            | 12      | 6         | 24.40     | 24.40     | 25.30     |
|               |            | 12      | 11        | 24.90     | 24.30     | 24.00     |
|               |            | 25      | 0         | 24.30     | 24.40     | 24.00     |
|               | 16QAM      | 1       | 0         | 25.00     | 25.00     | 24.60     |
|               |            | 1       | 13        | 24.80     | 24.90     | 24.60     |
|               |            | 1       | 24        | 24.90     | 24.80     | 24.70     |
|               |            | 12      | 0         | 23.40     | 23.60     | 23.20     |
|               |            | 12      | 6         | 23.40     | 23.60     | 23.10     |
|               |            | 12      | 11        | 23.30     | 23.40     | 23.20     |
|               |            | 25      | 0         | 23.20     | 23.50     | 23.00     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH  | Mid CH    | High CH |
|---------------|------------|---------|-----------|---------|-----------|---------|
|               |            |         |           | 20000CH | 20175CH   | 20350CH |
|               |            |         |           | 1715MHz | 1732.5MHz | 1750MHz |
| 4 / 10M       | QPSK       | 1       | 0         | 25.60   | 25.50     | 24.60   |
|               |            | 1       | 25        | 25.80   | 25.20     | 24.80   |
|               |            | 1       | 49        | 24.80   | 25.00     | 25.10   |
|               |            | 25      | 0         | 24.10   | 24.30     | 23.60   |
|               |            | 25      | 13        | 25.10   | 24.20     | 23.80   |
|               |            | 25      | 25        | 24.70   | 23.90     | 23.80   |
|               |            | 50      | 0         | 25.00   | 24.10     | 23.70   |
|               | 16QAM      | 1       | 0         | 25.00   | 25.10     | 24.30   |
|               |            | 1       | 25        | 25.50   | 24.70     | 24.30   |
|               |            | 1       | 49        | 24.40   | 24.60     | 24.70   |
|               |            | 25      | 0         | 23.00   | 23.30     | 22.70   |
|               |            | 25      | 13        | 23.90   | 23.40     | 22.80   |
|               |            | 25      | 25        | 23.60   | 23.10     | 22.80   |
|               |            | 50      | 0         | 23.80   | 23.30     | 22.80   |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH    | Mid CH    | High CH   |
|---------------|------------|---------|-----------|-----------|-----------|-----------|
|               |            |         |           | 20025CH   | 20175CH   | 20325CH   |
|               |            |         |           | 1717.5MHz | 1732.5MHz | 1747.5MHz |
| 4 / 15M       | QPSK       | 1       | 0         | 25.30     | 25.30     | 24.20     |
|               |            | 1       | 38        | 25.60     | 25.20     | 24.70     |
|               |            | 1       | 74        | 25.50     | 24.50     | 25.00     |
|               |            | 36      | 0         | 25.10     | 24.40     | 23.40     |
|               |            | 36      | 18        | 24.80     | 24.40     | 23.70     |
|               |            | 36      | 39        | 24.60     | 23.90     | 23.80     |
|               |            | 75      | 0         | 24.70     | 24.10     | 23.80     |
|               | 16QAM      | 1       | 0         | 24.90     | 24.80     | 23.70     |
|               |            | 1       | 38        | 25.20     | 24.80     | 24.30     |
|               |            | 1       | 74        | 25.10     | 23.90     | 24.60     |
|               |            | 36      | 0         | 23.90     | 23.30     | 22.50     |
|               |            | 36      | 18        | 23.80     | 23.40     | 22.80     |
|               |            | 36      | 39        | 23.50     | 23.00     | 22.90     |
|               |            | 75      | 0         | 23.60     | 23.30     | 22.80     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH  | Mid CH    | High CH |
|---------------|------------|---------|-----------|---------|-----------|---------|
|               |            |         |           | 20050CH | 20175CH   | 20300CH |
|               |            |         |           | 1720MHz | 1732.5MHz | 1745MHz |
| 4 / 20M       | QPSK       | 1       | 0         | 25.50   | 25.50     | 25.20   |
|               |            | 1       | 50        | 25.40   | 25.20     | 24.50   |
|               |            | 1       | 99        | 25.70   | 24.60     | 25.20   |
|               |            | 50      | 0         | 24.90   | 24.30     | 22.80   |
|               |            | 50      | 25        | 24.70   | 24.30     | 23.50   |
|               |            | 50      | 50        | 24.40   | 23.50     | 23.80   |
|               |            | 100     | 0         | 24.70   | 24.00     | 23.30   |
|               | 16QAM      | 1       | 0         | 25.10   | 25.20     | 24.70   |
|               |            | 1       | 50        | 25.10   | 24.80     | 24.00   |
|               |            | 1       | 99        | 25.30   | 24.20     | 24.80   |
|               |            | 50      | 0         | 23.70   | 23.20     | 22.00   |
|               |            | 50      | 25        | 23.60   | 23.40     | 22.60   |
|               |            | 50      | 50        | 23.40   | 22.70     | 22.90   |
|               |            | 100     | 0         | 23.60   | 23.20     | 22.50   |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH    | Mid CH  | High CH   |
|---------------|------------|---------|-----------|-----------|---------|-----------|
|               |            |         |           | 20775CH   | 21100CH | 21425CH   |
|               |            |         |           | 2502.5MHz | 2535MHz | 2567.5MHz |
| 7 / 5M        | QPSK       | 1       | 0         | 27.57     | 27.53   | 27.18     |
|               |            | 1       | 13        | 27.51     | 27.07   | 27.45     |
|               |            | 1       | 24        | 27.38     | 27.00   | 27.14     |
|               |            | 12      | 0         | 26.63     | 26.42   | 27.16     |
|               |            | 12      | 6         | 26.69     | 26.22   | 26.89     |
|               |            | 12      | 11        | 26.54     | 26.17   | 26.67     |
|               |            | 25      | 0         | 26.58     | 26.15   | 26.80     |
|               | 16QAM      | 1       | 0         | 26.78     | 26.83   | 27.18     |
|               |            | 1       | 13        | 26.67     | 26.22   | 27.49     |
|               |            | 1       | 24        | 26.43     | 26.26   | 27.05     |
|               |            | 12      | 0         | 25.80     | 25.57   | 27.01     |
|               |            | 12      | 6         | 25.80     | 25.38   | 26.68     |
|               |            | 12      | 11        | 25.66     | 25.25   | 26.63     |
|               |            | 25      | 0         | 25.63     | 25.27   | 26.78     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH  | Mid CH  | High CH |
|---------------|------------|---------|-----------|---------|---------|---------|
|               |            |         |           | 20800CH | 21100CH | 21400CH |
|               |            |         |           | 2505MHz | 2535MHz | 2565MHz |
| 7 / 10M       | QPSK       | 1       | 0         | 27.59   | 27.16   | 27.88   |
|               |            | 1       | 25        | 26.73   | 26.98   | 27.01   |
|               |            | 1       | 49        | 26.76   | 26.82   | 26.49   |
|               |            | 25      | 0         | 26.14   | 26.56   | 26.33   |
|               |            | 25      | 13        | 25.96   | 26.60   | 26.27   |
|               |            | 25      | 25        | 25.60   | 25.86   | 26.72   |
|               |            | 50      | 0         | 25.90   | 25.94   | 26.07   |
|               | 16QAM      | 1       | 0         | 26.86   | 26.71   | 27.14   |
|               |            | 1       | 25        | 26.01   | 26.21   | 26.42   |
|               |            | 1       | 49        | 25.99   | 26.12   | 26.09   |
|               |            | 25      | 0         | 25.40   | 25.62   | 25.33   |
|               |            | 25      | 13        | 25.13   | 25.19   | 25.32   |
|               |            | 25      | 25        | 24.75   | 24.91   | 25.74   |
|               |            | 50      | 0         | 25.08   | 25.07   | 25.14   |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH    | Mid CH  | High CH   |
|---------------|------------|---------|-----------|-----------|---------|-----------|
|               |            |         |           | 20825CH   | 21100CH | 21375CH   |
|               |            |         |           | 2507.5MHz | 2535MHz | 2562.5MHz |
| 7 / 15M       | QPSK       | 1       | 0         | 27.50     | 27.37   | 27.36     |
|               |            | 1       | 38        | 26.63     | 26.90   | 26.99     |
|               |            | 1       | 74        | 26.78     | 26.76   | 26.83     |
|               |            | 36      | 0         | 26.10     | 26.87   | 26.81     |
|               |            | 36      | 18        | 25.75     | 26.20   | 26.12     |
|               |            | 36      | 39        | 25.49     | 25.88   | 25.77     |
|               |            | 75      | 0         | 25.77     | 25.86   | 25.81     |
|               | 16QAM      | 1       | 0         | 26.86     | 26.79   | 27.36     |
|               |            | 1       | 38        | 25.76     | 26.51   | 26.97     |
|               |            | 1       | 74        | 26.03     | 26.43   | 26.83     |
|               |            | 36      | 0         | 25.30     | 25.79   | 26.84     |
|               |            | 36      | 18        | 24.98     | 25.18   | 26.12     |
|               |            | 36      | 39        | 24.58     | 24.65   | 25.83     |
|               |            | 75      | 0         | 24.95     | 24.93   | 25.87     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH  | Mid CH  | High CH |
|---------------|------------|---------|-----------|---------|---------|---------|
|               |            |         |           | 20850CH | 21100CH | 21350CH |
|               |            |         |           | 2510MHz | 2535MHz | 2560MHz |
| 7 / 20M       | QPSK       | 1       | 0         | 27.73   | 28.27   | 27.17   |
|               |            | 1       | 50        | 26.28   | 27.76   | 27.56   |
|               |            | 1       | 99        | 27.33   | 27.09   | 26.60   |
|               |            | 50      | 0         | 25.86   | 27.01   | 26.17   |
|               |            | 50      | 25        | 25.54   | 26.16   | 26.70   |
|               |            | 50      | 50        | 25.86   | 25.73   | 26.20   |
|               |            | 100     | 0         | 25.69   | 25.73   | 26.57   |
|               | 16QAM      | 1       | 0         | 26.95   | 27.26   | 26.22   |
|               |            | 1       | 50        | 25.55   | 26.31   | 26.75   |
|               |            | 1       | 99        | 26.54   | 26.40   | 26.21   |
|               |            | 50      | 0         | 24.88   | 25.82   | 25.35   |
|               |            | 50      | 25        | 24.59   | 25.10   | 25.80   |
|               |            | 50      | 50        | 24.81   | 24.63   | 25.18   |
|               |            | 100     | 0         | 24.71   | 24.66   | 25.69   |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH    | Mid CH   | High CH   |
|---------------|------------|---------|-----------|-----------|----------|-----------|
|               |            |         |           | 131979CH  | 132322CH | 132665CH  |
|               |            |         |           | 1710.7MHz | 1745MHz  | 1779.3MHz |
| 66 / 1.4M     | QPSK       | 1       | 0         | 26.19     | 26.41    | 26.42     |
|               |            | 1       | 2         | 25.83     | 26.09    | 26.11     |
|               |            | 1       | 5         | 26.30     | 26.37    | 26.36     |
|               |            | 3       | 0         | 25.90     | 26.12    | 26.10     |
|               |            | 3       | 1         | 25.93     | 26.19    | 26.18     |
|               |            | 3       | 2         | 25.95     | 26.17    | 26.17     |
|               |            | 6       | 0         | 24.91     | 26.04    | 25.06     |
|               | 16QAM      | 1       | 0         | 25.21     | 25.74    | 25.65     |
|               |            | 1       | 2         | 25.24     | 25.48    | 25.18     |
|               |            | 1       | 5         | 25.68     | 25.30    | 25.81     |
|               |            | 3       | 0         | 24.78     | 25.12    | 24.98     |
|               |            | 3       | 1         | 24.86     | 25.12    | 25.04     |
|               |            | 3       | 2         | 24.98     | 25.12    | 25.15     |
|               |            | 6       | 0         | 24.01     | 24.27    | 24.25     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH    | Mid CH   | High CH   |
|---------------|------------|---------|-----------|-----------|----------|-----------|
|               |            |         |           | 131987CH  | 132322CH | 132657CH  |
|               |            |         |           | 1711.5MHz | 1745MHz  | 1778.5MHz |
| 66 / 3M       | QPSK       | 1       | 0         | 25.99     | 26.13    | 26.50     |
|               |            | 1       | 7         | 26.04     | 26.19    | 26.40     |
|               |            | 1       | 14        | 26.11     | 26.26    | 25.17     |
|               |            | 8       | 0         | 24.97     | 25.10    | 25.51     |
|               |            | 8       | 4         | 25.08     | 25.24    | 25.43     |
|               |            | 8       | 7         | 25.06     | 25.25    | 25.30     |
|               |            | 15      | 0         | 25.03     | 25.10    | 25.38     |
|               | 16QAM      | 1       | 0         | 25.23     | 25.44    | 25.84     |
|               |            | 1       | 7         | 25.07     | 25.51    | 25.50     |
|               |            | 1       | 14        | 25.22     | 25.61    | 24.37     |
|               |            | 8       | 0         | 24.09     | 24.14    | 24.42     |
|               |            | 8       | 4         | 24.00     | 24.20    | 24.49     |
|               |            | 8       | 7         | 24.02     | 24.31    | 24.33     |
|               |            | 15      | 0         | 23.88     | 24.31    | 24.45     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH    | Mid CH   | High CH   |
|---------------|------------|---------|-----------|-----------|----------|-----------|
|               |            |         |           | 131997CH  | 132322CH | 132647CH  |
|               |            |         |           | 1712.5MHz | 1745MHz  | 1777.5MHz |
| 66 / 5M       | QPSK       | 1       | 0         | 26.04     | 26.11    | 26.66     |
|               |            | 1       | 13        | 26.05     | 26.22    | 26.51     |
|               |            | 1       | 24        | 26.25     | 26.40    | 25.38     |
|               |            | 12      | 0         | 24.98     | 25.05    | 25.50     |
|               |            | 12      | 6         | 25.11     | 25.13    | 25.49     |
|               |            | 12      | 11        | 25.10     | 25.29    | 25.50     |
|               | 16QAM      | 25      | 0         | 25.06     | 25.04    | 25.58     |
|               |            | 1       | 0         | 25.47     | 25.03    | 25.75     |
|               |            | 1       | 13        | 25.55     | 25.65    | 25.96     |
|               |            | 1       | 24        | 25.58     | 25.42    | 24.92     |
|               |            | 12      | 0         | 23.99     | 23.95    | 24.45     |
|               |            | 12      | 6         | 24.02     | 24.23    | 24.60     |
|               |            | 12      | 11        | 24.01     | 24.14    | 24.52     |
|               |            | 25      | 0         | 23.91     | 24.14    | 24.60     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH   | Mid CH   | High CH  |
|---------------|------------|---------|-----------|----------|----------|----------|
|               |            |         |           | 132022CH | 132322CH | 132622CH |
|               |            |         |           | 1715MHz  | 1745MHz  | 1775MHz  |
| 66 / 10M      | QPSK       | 1       | 0         | 26.25    | 26.02    | 26.30    |
|               |            | 1       | 25        | 26.03    | 26.09    | 26.36    |
|               |            | 1       | 49        | 26.35    | 25.76    | 25.54    |
|               |            | 25      | 0         | 24.79    | 24.69    | 24.99    |
|               |            | 25      | 13        | 24.86    | 24.97    | 25.34    |
|               |            | 25      | 25        | 24.79    | 25.08    | 25.29    |
|               |            | 50      | 0         | 24.75    | 24.85    | 25.19    |
|               | 16QAM      | 1       | 0         | 25.16    | 25.05    | 25.74    |
|               |            | 1       | 25        | 24.78    | 25.42    | 25.75    |
|               |            | 1       | 49        | 25.44    | 25.11    | 24.36    |
|               |            | 25      | 0         | 23.60    | 23.86    | 23.94    |
|               |            | 25      | 13        | 23.94    | 24.09    | 24.36    |
|               |            | 25      | 25        | 23.84    | 23.99    | 24.17    |
|               |            | 50      | 0         | 23.68    | 23.95    | 24.11    |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH    | Mid CH   | High CH   |
|---------------|------------|---------|-----------|-----------|----------|-----------|
|               |            |         |           | 132047CH  | 132322CH | 132597CH  |
|               |            |         |           | 1717.5MHz | 1745MHz  | 1772.5MHz |
| 66 / 15M      | QPSK       | 1       | 0         | 26.18     | 26.02    | 26.22     |
|               |            | 1       | 38        | 26.38     | 26.14    | 26.25     |
|               |            | 1       | 74        | 24.92     | 25.62    | 25.38     |
|               |            | 36      | 0         | 25.08     | 24.65    | 24.93     |
|               |            | 36      | 18        | 25.27     | 25.09    | 25.21     |
|               |            | 36      | 39        | 25.28     | 25.36    | 25.28     |
|               |            | 75      | 0         | 25.18     | 24.91    | 25.01     |
|               | 16QAM      | 1       | 0         | 25.08     | 25.16    | 25.67     |
|               |            | 1       | 38        | 25.51     | 25.23    | 25.32     |
|               |            | 1       | 74        | 24.28     | 24.89    | 24.72     |
|               |            | 36      | 0         | 23.97     | 23.74    | 23.84     |
|               |            | 36      | 18        | 24.41     | 24.14    | 24.16     |
|               |            | 36      | 39        | 24.28     | 24.26    | 24.30     |
|               |            | 75      | 0         | 24.19     | 23.97    | 24.05     |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH   | Mid CH   | High CH  |
|---------------|------------|---------|-----------|----------|----------|----------|
|               |            |         |           | 132072CH | 132322CH | 132572CH |
|               |            |         |           | 1720MHz  | 1745MHz  | 1770MHz  |
| 66 / 20M      | QPSK       | 1       | 0         | 26.38    | 26.56    | 26.62    |
|               |            | 1       | 50        | 26.20    | 26.13    | 25.96    |
|               |            | 1       | 99        | 26.00    | 25.93    | 25.65    |
|               |            | 50      | 0         | 24.94    | 24.41    | 24.99    |
|               |            | 50      | 25        | 25.14    | 25.05    | 24.95    |
|               |            | 50      | 50        | 24.75    | 25.43    | 25.17    |
|               |            | 100     | 0         | 25.14    | 24.88    | 24.75    |
|               | 16QAM      | 1       | 0         | 25.30    | 25.54    | 25.90    |
|               |            | 1       | 50        | 25.04    | 25.35    | 25.13    |
|               |            | 1       | 99        | 25.18    | 25.40    | 24.66    |
|               |            | 50      | 0         | 23.83    | 23.42    | 24.00    |
|               |            | 50      | 25        | 24.20    | 24.07    | 23.83    |
|               |            | 50      | 50        | 23.85    | 24.41    | 24.13    |
|               |            | 100     | 0         | 24.09    | 23.94    | 23.64    |

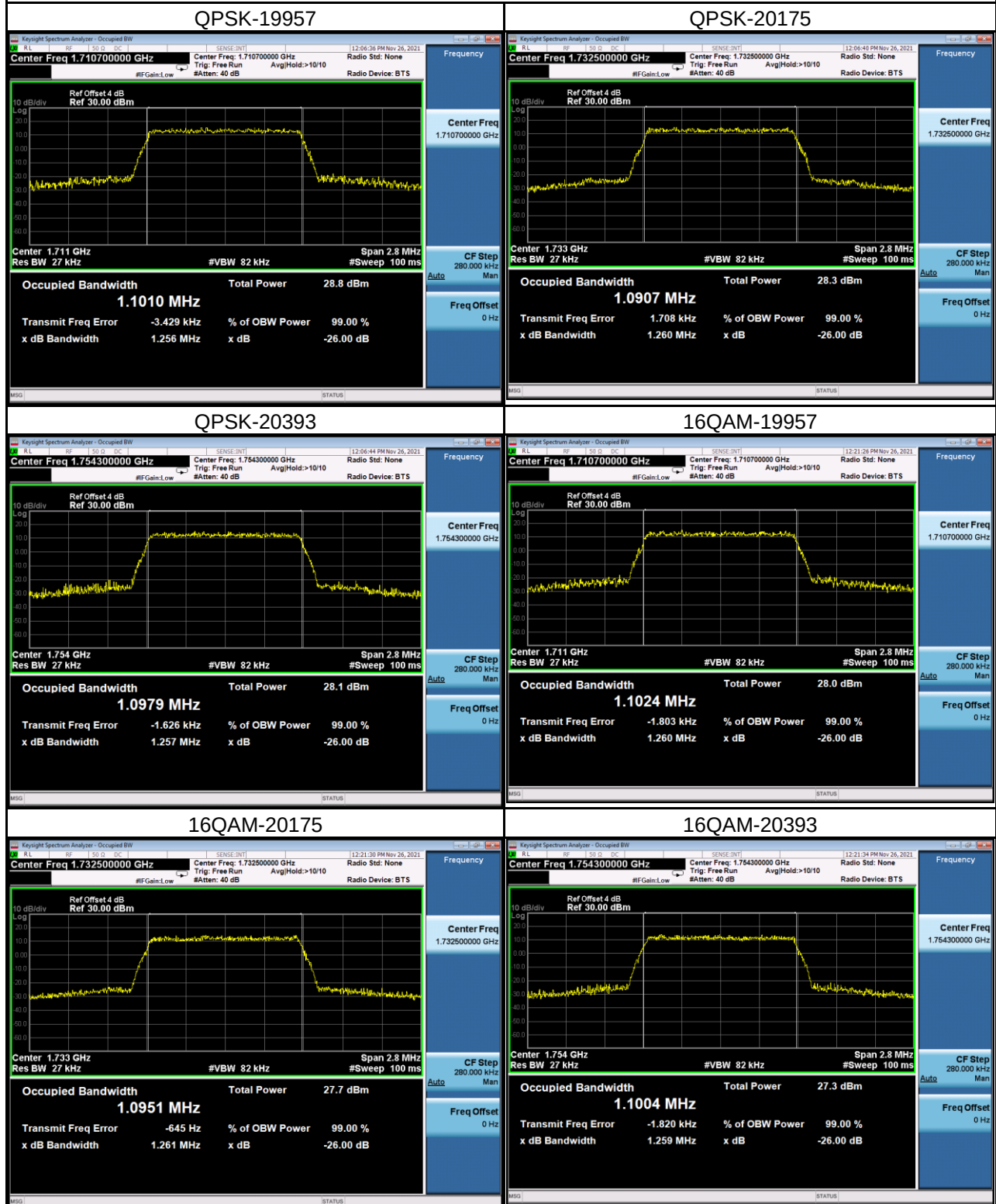
## **APPENDIX B - OCCUPIED BANDWIDTH**

| WCDMA Band IV |                 |                              |         |                 |                      |
|---------------|-----------------|------------------------------|---------|-----------------|----------------------|
| QPSK          |                 |                              |         |                 |                      |
| Channel       | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | Channel | Frequency (MHz) | 26dB Bandwidth (MHz) |
| 1312          | 1712.4          | 4.1567                       | 1312    | 1712.4          | 4.715                |
| 1413          | 1732.6          | 4.1627                       | 1413    | 1732.6          | 4.716                |
| 1513          | 1752.6          | 4.1643                       | 1513    | 1752.6          | 4.714                |



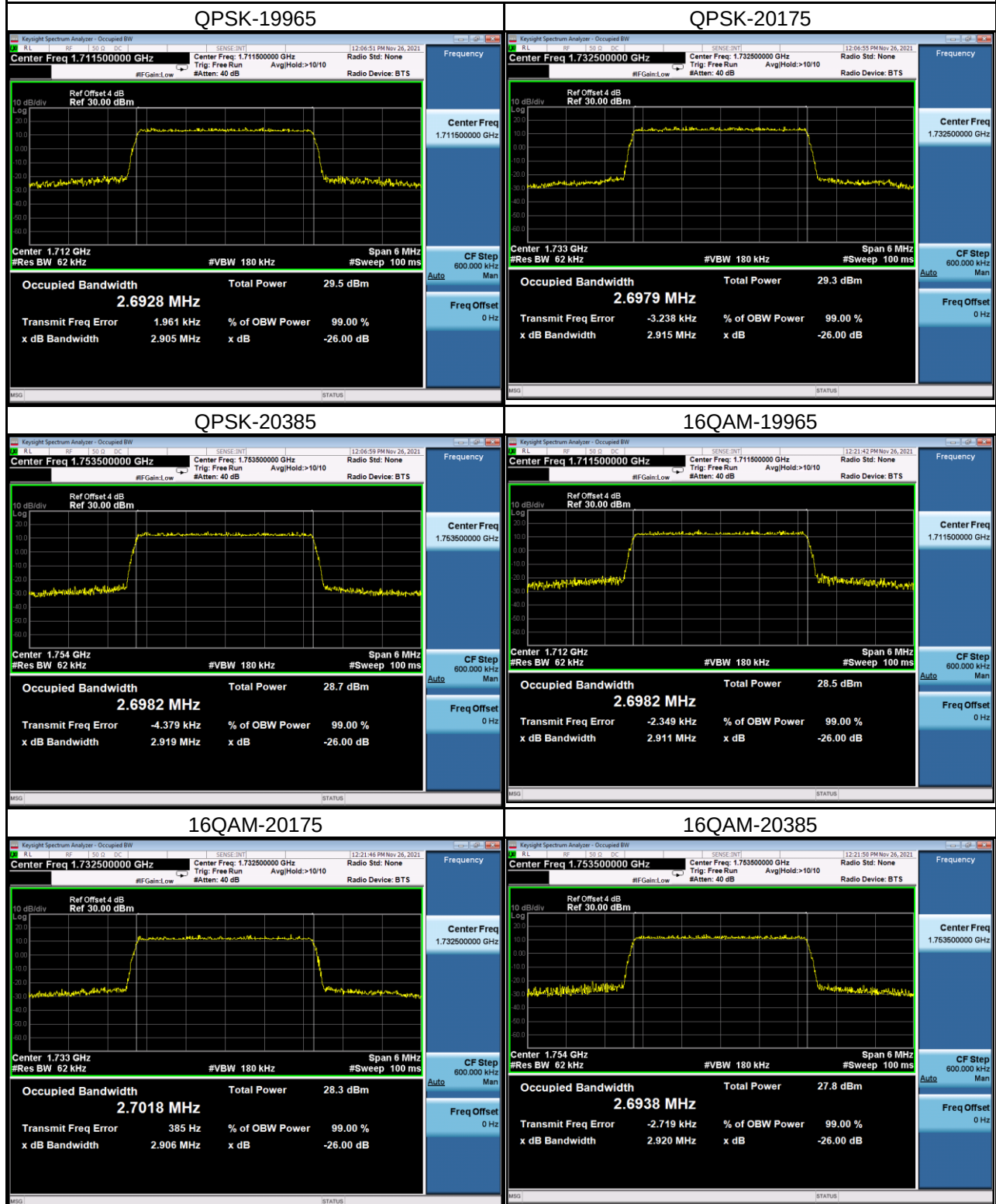
| LTE Band 4_1.4M |                 |                              |         |                 |                              |
|-----------------|-----------------|------------------------------|---------|-----------------|------------------------------|
| QPSK            |                 |                              | 16QAM   |                 |                              |
| Channel         | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |
| 19957           | 1710.7          | 1.1010                       | 19957   | 1710.7          | 1.1024                       |
| 20175           | 1732.5          | 1.0907                       | 20175   | 1732.5          | 1.0951                       |
| 20393           | 1754.3          | 1.0979                       | 20393   | 1754.3          | 1.1004                       |
| Channel         | Frequency (MHz) | 26dB Bandwidth (MHz)         | Channel | Frequency (MHz) | 26dB Bandwidth (MHz)         |
| 19957           | 1710.7          | 1.256                        | 19957   | 1710.7          | 1.260                        |
| 20175           | 1732.5          | 1.260                        | 20175   | 1732.5          | 1.261                        |
| 20393           | 1754.3          | 1.257                        | 20393   | 1754.3          | 1.259                        |

## Spectrum Plot



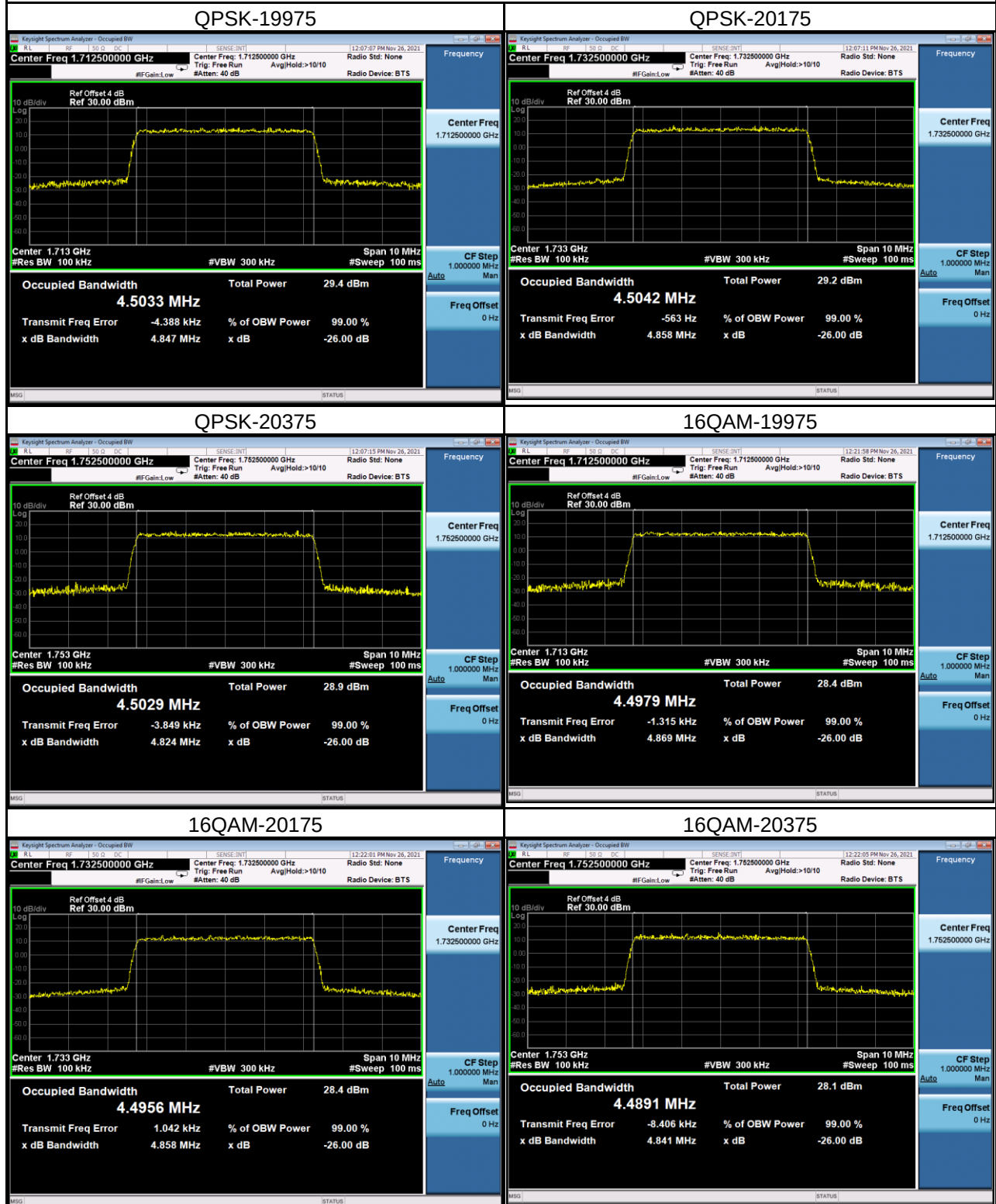
| LTE Band 4_3M |                 |                              |         |                 |                              |
|---------------|-----------------|------------------------------|---------|-----------------|------------------------------|
| QPSK          |                 |                              | 16QAM   |                 |                              |
| Channel       | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |
| 19965         | 1711.5          | 2.6928                       | 19965   | 1711.5          | 2.6982                       |
| 20175         | 1732.5          | 2.6979                       | 20175   | 1732.5          | 2.7018                       |
| 20385         | 1753.5          | 2.6982                       | 20385   | 1753.5          | 2.6938                       |
| Channel       | Frequency (MHz) | 26dB Bandwidth (MHz)         | Channel | Frequency (MHz) | 26dB Bandwidth (MHz)         |
| 19965         | 1711.5          | 2.905                        | 19965   | 1711.5          | 2.911                        |
| 20175         | 1732.5          | 2.915                        | 20175   | 1732.5          | 2.906                        |
| 20385         | 1753.5          | 2.919                        | 20385   | 1753.5          | 2.920                        |

## Spectrum Plot



| LTE Band 4_5M |                 |                              |         |                 |                              |
|---------------|-----------------|------------------------------|---------|-----------------|------------------------------|
| QPSK          |                 |                              | 16QAM   |                 |                              |
| Channel       | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |
| 19975         | 1712.5          | 4.5033                       | 19975   | 1712.5          | 4.4979                       |
| 20175         | 1732.5          | 4.5042                       | 20175   | 1732.5          | 4.4956                       |
| 20375         | 1752.5          | 4.5029                       | 20375   | 1752.5          | 4.4891                       |
| Channel       | Frequency (MHz) | 26dB Bandwidth (MHz)         | Channel | Frequency (MHz) | 26dB Bandwidth (MHz)         |
| 19975         | 1712.5          | 4.847                        | 19975   | 1712.5          | 4.869                        |
| 20175         | 1732.5          | 4.858                        | 20175   | 1732.5          | 4.858                        |
| 20375         | 1752.5          | 4.824                        | 20375   | 1752.5          | 4.841                        |

## Spectrum Plot



| LTE Band 4_10M |                 |                              |         |                 |                              |
|----------------|-----------------|------------------------------|---------|-----------------|------------------------------|
| QPSK           |                 |                              | 16QAM   |                 |                              |
| Channel        | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |
| 20000          | 1715            | 8.9530                       | 20000   | 1715            | 8.9707                       |
| 20175          | 1732.5          | 8.9456                       | 20175   | 1732.5          | 8.9386                       |
| 20350          | 1750            | 8.9755                       | 20350   | 1750            | 8.9665                       |
| Channel        | Frequency (MHz) | 26dB Bandwidth (MHz)         | Channel | Frequency (MHz) | 26dB Bandwidth (MHz)         |
| 20000          | 1715            | 9.702                        | 20000   | 1715            | 9.665                        |
| 20175          | 1732.5          | 9.667                        | 20175   | 1732.5          | 9.640                        |
| 20350          | 1750            | 9.656                        | 20350   | 1750            | 9.625                        |